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IntroductionIntroduction

The National Enforcement Training Institute (NETI), in conjunction with the Centers for Disease Control and Prevention (CDC), the Defense Acquisition University (DAU), the Human Resource Development Council (HRDC), the National Technical Information Service/National Audiovisual Center (NTIS), the Public Health Training Network, and the U.S. Food and Drug Administration (FDA), co-sponsored the second annual Government Learning Technology Symposium on April 29 and 30, 1996, at the Marriott Metro Center located in Washington, D.C. This document is a summary of the symposium's proceedings.

The two-day event provided an opportunity for Federal agency personnel to learn about existing educational technology capabilities and current developments that can be shared among agencies at various levels of Government, and to exchange information about Government-owned resources.

Presenters from industry and a host of Federal Government agencies addressed more than 200 participants in 28 workshops. Each 90-minute workshop emphasized how agencies can benefit from using new technologies. Topics ranged from budgeting and planning aspects of employing learning technology to design and technical considerations.

Opening RemarksOpening Remarks

Presenter:

Jerry Bryan, Director, National Enforcement Training Institute, U.S. Environmental Protection Agency
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Session Overview

Mr. Bryan convened the symposium by welcoming the participants and thanking the many co-sponsors in attendance, including CDC, DAU, HRDC, NETI, NTIS, the Public Health Training Network, and FDA.

Mr. Bryan noted that the first annual Government Learning Technology Symposium, held in 1995, attracted approximately 100 Federal Government personnel from 37 agencies. He commented that as a result of the technological revolution, new cost-effective, timesaving methods for training public employees need to be explored. Mr. Bryan concluded that over the next 2 days, participants will learn how to take advantage of existing learning technologies at the Federal, regional, and local levels and how to better educate public employees.

Keynote Address—Reinvention Training

Presenter:

Bob Stone, Project Director for Vice President Gore's National Performance Review

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Session Overview

Mr. Stone began by discussing the need to reinvent Government through training. Government cannot be reinvented without training because reinventing Government means changing the behavior of everyone who works for the Government, from managers to frontline workers. This span accounts for more than 1 million men and women.

Mr. Stone emphasized the need to receive training in order to adopt new attitudes by making reference to two books on the topics of new behavior and reinventing Government attitudes. The first, *In Search of Excellence* by Tom Peters, is filled with stories about people who changed their behavior and attitudes. The second, *Common Sense Government*, contains examples of Government workers who behaved the way all employees are going to have to behave if change is to be realized. Mr. Stone cited specific excerpts from the book, describing three different scenarios in which Government employees changed their behavior and made a difference. The three individuals worked in different sectors of the Government at different jobs at different pay rates, but they had one thing in common: They did not wait for someone to empower them. They saw something that common sense told them was wrong, and they made it right.

Mr. Stone added that enrolling employees in a course that would teach them this behavior probably would not prove successful. Instead, he suggested convening a series of 1-hour meetings consisting of staff, team members, subordinates, managers, and others in your office over the next 5 days. On the first day, discuss your product and for whom it is produced. On the second day, discuss excellence from the customer's point of view. On day three, discuss what could be changed if the customers were put first. Is the product designed for the employee's convenience or for the customer's convenience? On the fourth day, discuss ways of empowering subordinates, motivating them to take initiative, and on the fifth day, figure out how to "cut out the red tape."

At the end of the week, you and others in your organization will have had more useful training than practically anyone has had in their entire Government career. You will also have started to reinvent your division of the Government, and you will have thought of plenty of topics to discuss in subsequent meetings.

He concluded by encouraging people to read the two books mentioned earlier—*In Search of Excellence* and *Common Sense Government*—to reinforce the message, "You can do something. You can make things better."

Infrastructure Inventory AnalysisInfrastructure Inventory Analysis

Presenter:

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Session Overview

This session focused on strategies to help participants to find out more about their organization's or agency's information/technology infrastructure, and how that information can be used to successfully deliver computer-based training (CBT) products that fulfill previously identified requirements. Surveying an agency's information infrastructure, Ms. Bradbury said, often requires reaching out to individuals beyond the immediate organization. In discussing EPA experiences in assembling an inventory of its technology infrastructure, she stressed that the principles used in that effort are applicable to other agencies as well in moving from the requirements analysis to the design phase.

EPA's infrastructure inventory. Phil Paparodis of EPA's Office of Information Resources Management (IRM) related his experiences in helping to implement a strategic planning approach for IRM through data collection and assessment of existing Agency technology resources (such as the number and capabilities of personal computers [PCs] and multimedia systems) prior to implementation of new applications. Data collection is based on Office of Management and Budget (OMB) requirements.

Key elements to effective strategic planning include—

- Determining what technologies the organization plans to acquire. Agencies generally develop informational architecture plans on projected acquisition of technologies such as local area networks (LANs) and PCs.
- Ensuring consistency between an agency's technology standards and a technology architecture plan. Consistency helps to strengthen the cost-benefit case, especially when procurement of nonstandard technologies is planned.
- Utilizing data call information that an organization is generally required to collect in response to OMB requirements. This information can furnish a real sense of an organization's technology infrastructure. One example is an agency's IRM implementation plan, a year-by-year blueprint depicting the organization's information technology. At EPA, the IRM plan helped in cross-referencing specific strategic-plan goals with organizations investing in those initiatives. To locate the IRM plan, identify the group responsible for providing the organization's response to OMB's Bulletin 9506, or contact the OMB's Office of Information and Regulatory Affairs. Another information source is the OMB required 43-A Data Call and Report. This document can be referenced through OMB Circular A-11 and provides budgeting information for an organization on various categories of investment for computing, telecommunications, and software technologies.

Having access to this kind of information can favorably influence the outcome of justifying, on a return-on-investment basis, new projects—which is now a requirement of the Information and

Technology Management Reform Act stipulating the institution of agency review boards.

Information/Technology Roadmap (ITA Roadmap). Ms. Bradbury said that this product articulates EPA's strategic-planning vision to a more detailed level of implementation. The ITA Roadmap meets five organizational objectives: to support the IRM vision, to control costs, to enhance productivity, to provide technical direction, and to provide a framework for decision making. The roadmap is used for guidance, when new information technology requirements present themselves and in selecting appropriate tools that both satisfy requirements, and are compatible with, organizational standards.

"Low-end" CBTs. A year ago, Ms. Bradbury's office was contacted by EPA's Training Institute about distributing a CBT package designed to inform EPA staff about their contract and resources management responsibilities. The Institute explained that it needed to reach most of the Agency's staff with this CBT because many employees have contract and resource management duties. Based on information from EPA's PC inventory, Ms. Bradbury explained that a number of EPA PCs were "low-end" 286s and 386s. To reach these wide-area connected desktops, the Institute would need to distribute a DOS-based CBT. The Institute indicated that it planned to use a DOS package. The CBT is partially interactive, with simple graphics. It keeps track of responses, is delivered to the desktop, and allows a viewer to peruse the CBT's financial and resource management modules at his own pace.

"Middle-edge" CBTs. Ellen Epstein of EPA discussed the development of two multimedia CD-ROMs: a training system for RCRA inspectors, and an introduction to Superfund enforcement. The courses use narration, text, graphics, and limited video, and they provide interactive exercises for the student at regular intervals. This technology was chosen because of the need to convey some complex visual information. CD-ROM is a fairly stable technology, readily available commercially, with an expanding infrastructure to support it. She characterized it as "middle-edge" (as opposed to "cutting-edge") technology.

Determining Where the Target Audience Is Technologically

- In surveying the target audience, ask the right questions. It is advisable to have some kind of technology in mind prior to the survey, as the questions asked of the target audience will need to be specific in order to be effective.
- Determine whether the target audience actually has regular access to the technology proposed.
- Direct the right questions to the right people, which means doing some prior research on the organizational structure.
- Communicate with end users: determine their level of access to, and comfort with, the technology.

Multimedia CBT. Jerry Oakley of EPA's Safety, Health and Environmental Management Division Multimedia Lab discussed the development of a high-end CBT package. After reviewing the results of an organizational survey, his office decided to purchase a Windows-based, multimedia system. Some problems were identified, and it became clear that multiple approaches to delivering the CBT needed to be developed. Early CBT packages were expensive, as the multimedia lab needed to learn how to develop and implement them. To minimize development costs, the office focused on using license-free software. Now, the lab is putting field training centers in regional offices, consisting of a full-blown Pentium multimedia unit complete with a full complement of software.

CBT features. As part of the CBT training course, the EPA multimedia lab developed learning, information, support, and training modules. The modules are relatively inexpensive, very timely, and flexible. Using the modules and putting manuals in hypertext ultimately saved time and money. The performance support modules, which develop formal support guidance, are becoming increasingly important. The reports are structured so that their formats are similar, allowing for easier collation of the data contained within the reports. The aim is to make the job of the people in the field easier, and negotiating the CBT package is done on simple “point-and-shoot” principles. Manuals are put online, and the policies are highlighted.

CBT example. A CBT package for the Office of Water, “Sampling Wastewater at a Wastewater Treatment Facility,” contains six different programs. Relevant portions of the CFRs are highlighted. The CBT package contains short video clips, and each chapter has a summary page and a practice exam based upon scenarios. The CBT package is interactive to keep the learner interested, and if a CBT package’s length goes beyond 70 screens, it is broken up into smaller components. The material is designed to be as generic as possible, with a main menu as a cynosure from which more detailed instruction can be accessed. Other agencies use these packages. Mr. Oakley said that he would make copies of any of these products for participants if they would send him a disk.

Discussion

The following is a summary of the discussion after the presentations.

- Concerning data rights, one session participant remarked that any authoring tool sold to the Government must provide for unlimited and free distribution, and he suggested participants check with their contracting officers if they had heard otherwise. Copyrights on videos and pictures that have been incorporated into multimedia presentations present a complicating issue.
- Mr. Oakley said that the EPA multimedia lab uses contractors to staff the lab, as there was no in-house capability. Ellen Epstein said that her CBT packages were contracted out: one to Booz, Allen and Hamilton, and one through the Office of Personnel Management’s (OPM) training contract. Using the OPM’s contract gave them flexibility, but it can be costly.
- Mr. Oakley attributed part of the development cost to the lab learning how to put these products together. He has had more success with onsite development than with contracting it out.
- CBT can print out certifications of completion for the training modules that can then be presented to supervisors, but a vehicle has not yet been developed for notifying supervisors directly of successful completion. Software is available, however, that allows for centralization of this documenting function.

Reengineering Attitudes About Distance Learning

Presenters:

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Session Overview

The session explored techniques that organizational engineers can use to change traditional attitudes toward, and gaining support for, instructional technology projects.

Two major paradigm shifts are important in reengineering attitudes about distance learning: (1) the shift from training (instructor-driven) to learning (learner-driven) and (2) the shift from a limited view of distance learning (i.e., satellite broadcast of classroom training) to the broader view of learning distributed over long distances through an array of multimedia tools including video, CD-ROM, the Internet, and satellite broadcast.

To be successfully adopted, a distance learning project needs to encompass these two paradigm shifts. It needs to be viewed as a learner-driven tool that improves individual or group performance and supports the organization's mission.

In preparing to market distance-learning projects, organizational engineers must consider the audience they are attempting to influence. The "Technology Adoption Cycle" provides a diagnostic tool for developing a marketing strategy. The Technology Adoption Cycle classifies people based on their views of technology. The five classifications are the following: (1) the innovator, (2) the visionary, (3) the pragmatist, (4) the conservative, and (5) the skeptic.

The Technology Adoption Cycle—How It Works

To influence effectively, you must first understand the view of the person you are trying to influence and how to manage the view.

- *The innovator.* A "techie." Wants to be the first in the office to experiment with a new technology. Is willing to spend hours trying to get products to work. Technology is a central interest, regardless of what function it is performing.
How to manage: An easy sale. Provide freedom to explore new technologies and new applications of old technologies within parameters. Outline the "training" problems and let them be involved in providing a technological solution. Give them the job of BETA testing and debugging new projects.
- *The visionary.* An early adopter. Has the insight to match an emerging technology to a strategic opportunity. Risk takers. Not a technology enthusiast, per se, but willing to try a new technology if it holds the promise of a leap in productivity.
How to manage: Ask them to focus on organizational performance. Encourage analysis, such as cost/benefit and life-cycle cost.

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- *The pragmatist.* Willing to become technologically competent, where necessary. Looking for technology to enhance, not overthrow, the established new ways of doing business. Does not want to debug somebody else's product. Wants a "turnkey" product.
How to manage: Create discomfort with the status quo. Provide references and testimonials from other pragmatists. Demonstrate that you have analyzed and will manage the risks involved in implementing a technology change.
 - *The conservative.* Change is disruption. Easily frustrated in using technology products. Waits until everyone else is using the new technology. More comfortable with tradition than progress.
How to manage: Remove support from old system. Create positive and negative incentives. Fully debug and simplify the product. Transition slowly with lots of hand holding.
 - *The skeptic.* Prefer not to have anything to do with technology. Too expensive, disruptive, and time consuming. Skeptical about the sales claims made about high-tech products and the value they actually deliver.
How to manage: Develop a plan to manage their resistance. They can negatively influence the rest of the organization's acceptance of new technology. The best technology solution for the skeptic is one buried so deep inside another product that they hardly know that it is there. For example, a digital watch.

Audience Participation

Each session participant was given 30 cards. Each participant received six cards for each of the five views (listed above). All 30 cards were color-coded (see below) and defined aspects of one of the five viewpoints. For example—

- Blue cards described characteristics of the innovator.
- Orange cards described characteristics of the visionary.
- Yellow cards described characteristics of the pragmatist.
- Red cards described characteristics of the conservative.
- White cards described characteristics of the skeptic.

Each participant was asked to place the cards in three separate piles: (1) “A lot like me.”; (2) “A little like me”; and (3) “Not like me at all.” Once all participants had placed their cards in the three piles, they made a determination of where they fell within the Technology Adoption Cycle (how easy or difficult they would be to influence) based on the pile that contained the greater number of similarly colored cards.

The Outcome

After completing the exercise, participants were grouped as follows:

- Three innovators.
- Nine visionaries.
- Six pragmatists.
- One conservative.
- No skeptics.

Participants noting their position within the Technology Adoption Cycle were able to identify their weaknesses and strengths in adopting the incorporation of distance-learning technologies into their organizations. In understanding their weaknesses and strengths, they were able to recommend strategies that may assist an innovator in being more creative, or a pragmatist in being less hesitant about change.

The Technology Adoption Cycle lists the viewpoints in the following order: innovators, visionaries, pragmatists, conservatives and skeptics. A survey population typically falls along a bell curve with innovators and skeptics representing the smallest populations. Pragmatists and conservatives comprise the largest populations.

(It should be noted that there are gaps between each viewpoint. The largest gap is between the visionary and the pragmatist. Geoffery Moore, in his book *Crossing the Chasm* calls the gap between visionaries and pragmatists the “chasm” and offers a host of strategies for marketing technology to the various viewpoints.)

Recommended Strategies

To achieve the goal of having an organization to adopt distance-learning technologies—

- Tie the organization’s *need* to its *mission*.
- Identify *proper* technology.
- Explain benefits.
- Plan for minimizing risks.

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- Perform cost/benefit analyses.
 - Implement a good evaluation process.

Recommended Reading

Moore, Geoffery. *Crossing the Chasm. Adapted from information on Technology Adoption Cycle.* 1991.

Multimedia Standards and CompatibilityMultimedia Standards and Compatibility

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Session Overview

As multimedia technology continues its unprecedented growth, users are left with several questions: What hardware and software can be bought today that will not be obsolete tomorrow? How will technology standards change? What among today's technology will most likely be compatible with the media being developed tomorrow? To address these concerns among Government training and education professionals, Mike Rubinfeld and Richard G. Maynard presented information on what users can expect in terms of industry standards for CD-ROM, and the compatibility of multimedia technology of differing generations. This presentation discussed the anticipated evolution of standards and compatibility of multimedia to accommodate new technologies (specifically digital video discs), and the steps to be taken to develop technology that supports universally accessible electronic documents.

Evolving standards. Similar to the technology itself, standards associated with multimedia technology are in a state of flux. The goal of Government standards committees is to help the multimedia community build standards by helping developers communicate with users. This communication allows users to tell developers what they need in multimedia products. In addition, Government technology agencies seek to promote competition in technology so that if one company folds, the user is not stuck with a technology that is suddenly obsolete. Attendees were urged to track industry trends for clues on how technology, and in turn standards, would develop.

Digital video disc. A useful example of the transference of standards is emerging with the new digital video disc (DVD) technology. DVD, which was released in the late summer 1995, will have a dramatic impact on ISO 9660, the standard governing CD-ROM volume/file structure.

DVD, which stores highly compressed data, will change how information is stored. According to the presenters, DVDs are expected to store at least 7.5 gigabytes of data on one disc. This data will include full-motion pictures at speeds of 30 frames-per-second. Presenters believe that the framework for CD-ROM standards is flexible enough to accommodate change.

Digital video discs will create considerable confusion in the standards community and may evolve into as many as four different types, each offering its own advantages and disadvantages.

Estimates are that DVDs will store a minimum of 4.7 gigabytes of data; a nominal of 7.5 gigabytes; and a maximum of 9–10 gigabytes.

Physical variables are also undetermined. Possible products include—

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- DVD-ROM.
 - DVD-digital audio.
 - DVD movies.
 - DVD-I (similar to CD-I).

Compatibility and evolution of technology. In terms of compatibility, DVD players should be able to play CD-ROM discs. However, new video standards could make use of MPEG-1 problematic in next 2–3 years. One video standard is predicted to survive: ISO 1049, the physical layered standard. According to the presenters, the primary obstacle to compatibility will be the read mechanisms. Length of laser in DVD is different from that found in CD-ROM players. Some DVDs may play CDs, while others may not. Therefore, the next 2–3 years will serve as a transition period, as manufacturers move closer to a play-and-play environment, where manufacturers are not fine-tuning systems to accommodate specific technology.

Compatibility topics discussed included—

- *JPEG update.* The Joint Photo Expert Group (JPEG), which established standard ISO 10918:1992, governs standards associated with digitizing photos. The standard governs three aspects of the technology: encoder, decoder, and the interchange format. Some users have experienced difficulty with the compatibility of some JPEG files on their equipment. The presenters said this difficulty is often the result of manufacturers' shift away from the standard in an attempt to gain a proprietary domain. If manufacturers abide by the JPEG standard, then the technology should enjoy universality.
- *MPEG update.* The Motion Pictures Expert Group (MPEG) established the standard ISO 11172: MPEG-1, which addresses the compression of video signals. MPEG offers up to 1.5 megabits of output; MPEG Audio compresses audio signals at rates of 64, 128, and 192 video bits. MPEG standards are used in conjunction with many forms of mass media. Technologies affected include the following: hard drives, CD-ROMs and other forms of optical storage, writable CDs, DAT tape, and network servers. For clues about MPEG compatibility with new technology, participants were advised to watch commercial designers of format. Following industry trends will allow users to anticipate its direction.
- *Portable document delivery formats (PDDF).* PDDF standards are based on a blue-ribbon panel's recommendations for a set of basic requirements to establish a minimal form of document compatibility. The requirements address documents intended for delivery in final format.

Elements include—

- Encoding represented.
- Electronic medium.
- Final form presentation quality.
- Virtual pages versus hard copy page.
- No variance within interchange domain.

PDDF represents the shift in information sharing from a page concept to a database concept. The files include text, sounds, and patterns (mathematics). Currently, presenters contend, people are not using the geography that is available. Today, users are accustomed to seeing text and photos on an electronic page. In the near future, users will experience sound bytes and video clips as part of the page.

Negotiating file conversion. Currently, users who try to transfer files electronically often experience a myriad of difficulties. These difficulties are often caused by differences in proprietary formats, solved only when users resort to ASCII as the common denominator. These difficulties have led to the development of software that allows for a more common format for electronic documents. These products are already available. They include—

- Adobe Systems—Acrobat, PDF, and Postscript.
- No Hands Software—Common Ground.
- Farallon Replica.
- WordPerfect Envoy.
- Interleaf Worldview (SGML).
- Electronic Book Technologies Rainbow.
- Microsoft RTF Rich Text Format.

In regard to universality among Government agencies, the standards community's goal is to identify the needs of the Government community, develop a set of requirements, and assess the ability of current technologies to support those needs and requirements. The development of PDDF is a step toward that goal.

Benefits of PDDF

- Tower of Babel is gone.
- Cost savings in conversion and use of software.
- Ease of use of electronic medium.
- Storage cost savings.
- Paper cost savings.
- New way to preserve documents.

Twenty requirements for PDDF. Listed below are the 20 requirements that the standards are designed to meet:

1. Open published PDDF.
 - Accessible to public at reasonable cost.
 - Formats can be accessed by a number of platforms with no change to text.
2. Commercially available software.
3. Platform independence.
4. Modular specifications to support expectations.
5. Support for document preparation sources.
6. Support for full-dimensional graphics.
7. Devise independent color support.
8. Full range of textuality, formatting, and typography.
9. Computer stage space efficiency.
 - Allow for compression.
10. Allow access/use restrictions.
 - Security/passwords exception.

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11. Document construction and requirement capabilities.
 - Be able to move text around
 12. Accessibility of text for copy (and paste).
 13. Capture structure.
 14. Support navigational aids.
 - Hyperlinks.
 - Search and retrieval.
 15. External Hyperlink capabilities.
 - Link to other Web sites, etc.
 16. Page fidelity.
 - Spacial relationships remain in tact.
 17. Large document scalability.
 18. Allow storage in single or multiple files.
 19. Enable accessibility for the disabled.
 - Accessible to everyone (ISO 12083).
 - Bridge to SGML encoding.
 - Allow for conversion to braille.
 - Allow for conversion to voice synthesis.
 - Adobe has started to enhance accessibility.
 20. Allow print capabilities directly from the monitor.
 - Print page as seen on screen.

Recommendations

To spur the development of PDDF, Government experts recommend both a conformance variation and the organization of a users forum, composed of Government users and industry developers. These two measures will build flexibility into standards, and they will help ensure that the technology and standards meet the needs of the users.

Self-educated consumers. The development of portable documents will dismantle many of the barriers currently in place in electronic communications. Presenters say that industry is feeling the momentum for universality of interface, where information can flow more freely over differing hardware and software. For information on these issues, presenters recommend that users stay close to the industry news media.

Change in this area is a step function in the next 2–4 years that will exhibit more change than that found in the last 15 years. Commercial motivations promote change, including the development of a new version of HTML—HTML2.

Discussion

Buying a CD burner. A participant asked if he should buy a CD burner in order to meet his CD production needs. Presenters recommended against the purchase of a CD burner. Instead, they recommended that participants in need of CD burning use a commercial vendor. CDs may or may not be readable in DVD drivers and the purchase of a CD burner system could create CDs with compatibility problems.

Transition from CD-ROM to DVD. A participant asked how long the transition in technology will take. Presenters said that industry professionals estimate the transition will be fully under way in 1997. Meanwhile, Government experts predict that the lack of agreement by commercial entities on firm standards will slow the stability in the technology, and therefore slow the reduction in cost. This slowing-down of the process leads Government experts not to anticipate the full transition until 1998 or 1999.

Investing in technology. A participant stated that she would like to prepare for equipment purchases, and she asked for guidance on which technology in which to invest. Presenters replied by saying that the DVD industry is in such flux that large-scale purchases should be delayed by about a year. Presenters recommended that potential buyers plan to invest in media that will survive the transition period. Many of those decisions will be driven by manufacturers. Participants were urged to watch their options. In essence, presenters said that technology simply has not evolved yet, and industry will need approximately 1 more year to determine a clear path.

Keep in touch. Presenters recommended that participants keep in touch with industry trends through magazines such as *New Media*, *Byte*, and *CD-ROM Professional*. Other sources of up-to-date information are available at technology leaders' Web sites. Sites mentioned include Microsoft (<http://www.microsoft.com/>) and Adobe (<http://www.adobe.com/>).

Instructional Design for Distance Learning and Adult Learning Theory

Presenters:

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Session Overview

This session provided participants with a basic understanding of one model of instructional design that can be applied to distance-learning product development. Presenters illustrated this model with a variety of distance-learning products, including satellite videoconferences and computer-based training.

The presentation centered on the importance of the different types of interaction that take place during training, and the role each plays in ensuring high-quality distance learning.

The model for instructional design used to illustrate this point was one developed by Michael Moore of Pennsylvania State University. It presents four levels of learner interaction necessary for effective distance learning:

- *Learner to interface.* That which enables the learner to access the training. In the case of distance learning, the interface might be a television monitor, a telephone, or even a print-based self-study module.
- *Learner to content.* How the learner processes the content—in essence the intellectual reaction.
- *Learner to instructor.* The human touch—building in personalization.
- *Learner to learner.* Student-to-student interaction, for example, through group activities.

Learner to interface. The interface is the tool or format used to provide information to the learner. In any situation using technology, such as distance learning, the need for backup systems or redundancies in equipment or delivery systems is critical. Otherwise, should a failure occur, the training will fail because the learner will no longer have access to the training.

To illustrate learner-to-interface interaction, James Roppo discussed his team's experiences on the live satellite project, "Community Connections for HIV Prevention." This training was developed as a 5½ hour presentation and was telecast live to 2,700 people at 60 sites across the country. To minimize the potential for technical interference in the training, the CDC Team—

- Conducted a technical rehearsal 2 days prior to the broadcast.
- Conducted a full dress rehearsal 1 day prior to broadcast.
- Built in as much redundancy in the equipment used in the studio as their budget would allow.
- Produced a master tape of the training sessions to send out to any audiences who did not receive the entire broadcast.
- Encouraged each site to record the sessions on VHS tapes to enable them to review any part of the training or provide them to people who were unable to stay for the entire training.

In general, the post-broadcast evaluation was very positive. Although some learners criticized the length of the training, most found it useful. Mr. Roppo summarized the response to the satellite learning experience with the following quote from one evaluation form:

"The use of satellite uplinked television transmission for complicated, detailed, and voluminous information transfer works. It gets the points across effectively and efficiently. It saves money in travel and lodging costs that would be incurred by NCPS trainers were they to be sent out personally to each location. It provides each remote location with exactly the same content information as all others received. Its interactivity aspects seem to draw the audiences in the individual downlink sites closer into the process. It seems to have the unique ability to capture peoples' attention and fire-up their senses of positive receptivity, all of which seems to stem simply from the use of the television media itself."

Learner to content. Learner-to-content interaction takes place between the learner and the information in the lesson, or, in other words, the intellectual interaction. In distance-learning design, making the most effective use of the visual mediums is essential to build in "edutainment" into the presentation. By making the lesson both relevant and entertaining, the intellectual interest of the learner can be maintained.

To illustrate this point, Ms. Gibbs gave a demonstration of a computer-based training program developed for the Public Health Training Network to instruct CDC field personnel on outbreak investigation techniques. The design of the program took into consideration the intended audiences, the objectives of the program, and the unique needs and preferred learning styles of adults.

A real-life case study is used in the program. Several sample screens were shown to illustrate how the audience's needs were addressed to reach the objectives of the program. Techniques used included—

- Cartoon illustrations to engage the learner in the process and provide the needed "edutainment" value to the program. The team used the highest-end graphics possible, keeping in mind that the program needed to run on the "lowest common denominator" equipment available to the audience.
- A teacher/principal character to bring in the tutorial aspect and provide opportunities

throughout the program for the learner to apply what was learned.

- Interactive screens that allow the student to self-select areas to investigate.
- Onscreen lessons on how to fill out worksheets as the learner would be required on the job, followed by opportunities for students to do their own work manually using a calculator and filling out worksheets provided as part of the course packet.
- An imbedded statistical program that allows the learners to practice using a tool that will be available to them on the job.
- A home screen that gives options for proceeding through the program. This technique was used throughout the program, providing students with options or selections on how to proceed and ways to test strategies. Several screens offer lists of questions to ask at different points during the disease investigation.
- Reference tools such as online access to journal entries, texts, etc.

Learner to instructor. Building in the human touch becomes critical in distance-learning programs. This enables the learner to feel that he is truly interacting with the instructor. Cmdr. Higgins showed how this interaction was accomplished in a series of satellite broadcasts conducted by FDA.

In 1994, FDA's State training branch was tasked with developing a program to introduce a new investigative approach to State and local food safety regulators and investigators. With an estimated 6,000 State and local regulators and investigators who needed to be trained and only 6 trainers, the FDA team determined that a series of broadcasts would be both efficient and cost effective.

Two programs were developed, one in 1994 and a second in 1995. Each broadcast was viewed by an estimated 6,000 participants at 200 sites. The first broadcast, conducted over 4 days, was 16 hours in length and included lectures, panel exercises, and Q&A sessions. Site facilitators were responsible for guiding exercises and answering questions as well as logistical support.

Evaluation of the program revealed that it was too long, that it needed more examples or practical applications, and that it did not include enough time for the learners to interact with each other.

Incorporating what was learned from the 1994 program, the second program was shorter, less formal in format, and more interactive. The program was titled "Hometown HACCP: Recipes for Food Safety," ran only 3 hours, and employed humor and friendly competition between the sites to bring that needed human touch. Other techniques used included—

- Encouraging the sites to incorporate the 3-hour course into workshops or meetings as part of a larger whole.
- Using the site facilitators for logistical support only.
- Presenting a dramatization of an investigation (very successful).
- Keeping the lectures to 20 minutes in length (down from 50 minutes in the first program).
- Using faxes and telephones to receive questions from all the sites and respond immediately to participants.

Learner to learner. Interaction between students is known to be especially important to adult learners, indicated Ms. Jensen. When designing distance-learning programs, trainers need to work to build in opportunities for students to work together. Key points to address in the design of the program include the following:

- Make the lessons relevant to the work of the employee.
- Plan for reporting results.
- Allow enough time.
- Ensure student participation (onsite facilitator).

In the evaluation of the first HACCP broadcasts, participants repeatedly mentioned the need for more interaction with other students. To address this need, interactive and group activities were woven in throughout the second program. Further, friendly competition between the sites was fostered when the instructors would mention the name of the State or agency that sent in the questions or comments being shared.

Discussion

The role of humor in bringing the human touch to distance learning was discussed at length. Humor was used extensively in the second HACCP program. Examples included airing out-takes at the end of the program, physical humor, and the use of a relaxed, jovial atmosphere throughout the 3-hour training.

Opportunities for training session attendees to ask questions were also explored. In HACCP programs, telephone lines were manned throughout the program and for some time afterwards. Questions could also be sent by fax. Many of these questions were worked immediately into the Q&A sessions of the live broadcast, strengthening the interactive connection between the instructors and the students.

Time frames for development of the telecast programs were described in detail. Mr. Roppo explained that the Community HIV Prevention telecast took 1 year from start to finish and 6 months of concentrated effort to produce. The HACCP programs took 6 months to design, develop, write, and produce.

The issue of resistance to distance-learning formats, especially teleconferences, was addressed by several presenters. There was general agreement that resistance on the part of trainees has lessened considerably in the last few years. Many trainees have learned to appreciate the convenience of distance learning, including not having to travel, shorter interruptions in their usual schedules, as well as the cost benefits.

White House Learning Technology ProjectsWhite House Learning Technology Projects

Presenter:

Anna Doroshaw, Internal Learning Consultant, U.S. Environmental Protection Agency
Learning Institute

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Session Overview

Ms. Doroshaw opened the session by welcoming the participants and explaining her involvement with the Human Resources Development Council (HRDC) and the Learning Technology Project. She said her objectives for this session were to discuss some past and ongoing activities generated by a request from the White House to the HRDC concerning the use of technology for learning as well as for more traditional human resource functions.

White Paper on the Federal Government's Use of Learning Technologies in Education and Training for the Federal Workforce and the Learning Technology Project. When White House staff learned about the Council, they requested a White Paper on the Federal Government's use of learning technologies in education and training for the Federal workforce. Ms. Doroshaw authored this paper a year and a half ago. Subsequently, another request for a study was handed down, which asked for further explanation on—

- Creating a learning fund that would allow research and development activities to take place throughout all levels of Government on the use of technology for learning when funding was not forthcoming from their own agencies. A learning fund would enable much sharing across agencies, and actions taken would be done jointly across such agencies.
- Utilizing existing centers of excellence—agencies could borrow expertise rather than buying it or recreating it.

This Learning Technology Project, which culminated last December, focused on these two meshed topics. The use of learning technology and how this technology could work to the Council's advantage were discussed. Participants at the conference had made a commitment on their own to do followup work. Six workgroups formed out of the conference:

1. *Learning for Performance for the Learning Technology Practitioner Community*
POCs: Ruth Salinger, HHS, (202) 690-5549, fax (202) 690-8328
E-mail: rds@ospahh6.ssw.dhhs.gov
Renelle Rae, EPA, (202) 260-3297, fax (202) 260-6786
E-mail: rae.renelle@epamail.epa.gov
2. *Learning Technology Contracts*
POCs: Tom Horan, GSA, (703) 603-3206, fax (703) 603-3258
E-mail: tom.horan@gsa.gov
Bettie Feit, GSA, (703) 603-3250, fax (703) 603-3258
E-mail: bettie.feit@gsa.gov
3. *Partnership and Collaboration*
POCs: Lisa Nelson, EPA, (202) 260-8782, fax (202) 260-1347
Elaine Rand, E.D., (202) 401-0510, fax (202) 401-2780
E-mail: elaine_rand@ed.gov
Gary Wall, GSA, (703) 760-7779, fax (703) 506-3322
E-mail: gary.wall@gsa.gov
Tony Gutierrez, USDA, (214) 767-8212, fax (214) 767-8205
E-mail: agutierr@dal.grad.usda.gov
4. *Strategic Planning and Policy*
POCs: Anna Doroshaw, EPA, (202) 260-7344, fax (202) 260-6786
E-mail: doroshaw.anna@epamail.epa.gov
Dennis McDowell, CDC, (404) 639-1627, fax (404) 639-3982
E-mail: dlm4@phpmts1.em.cdc.gov
5. *Learning for Performance Improvement*
POC: Walter Chiavacci, E.D., (202) 401-1583, fax (202) 401-0434
E-mail: walter_chiavacci@ed.gov
6. *Technology Assessment*
POC: Bill Daniels, GSA, (703) 760-7590, fax (703) 506-3322
E-mail: william.daniels@gsa.gov

Ms. Doroshaw stated that the objective of this session was to focus on the recommendation of establishing a learning fund. Issues such as how to take advantage of physical resources and capabilities in Government, and how to create a mechanism that would incorporate private-sector and academic capabilities, should be addressed.

Ms. Doroshaw then divided the group into smaller workgroups to brainstorm on the recommendation resulting from the White Paper on creating a learning fund. She asked the individual workgroups to explore the following questions:

- What is the *learning fund*?
- How do we create an investment framework to facilitate joint ventures for new development and continuing research?

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- Where will it reside, and who will administer it?
 - Can the Federal Technology Transfer Act serve as a model to encourage collaboration among public, private, and academic sectors?
 - What will the criteria be for accessing the fund?

The results should enable us to do more across Government and create an infrastructure that supports the work we are doing.

Following the individual workgroup sessions, the results were shared. The recommendations were as follows:

- Charging for courseware and expertise.
- Percent development of products, new money, CRADAs.
- People should have access to the money they contribute to the central fund.
- The learning fund should include all money, expertise, resources, and procurement strategies.
- Money could reside in a foundation (with an independent banker, not in the Government) that could take money and reward success.
- Anyone with a good track record of partnerships can use money, but it should benefit others.
- Concern with surplus money at the end of fiscal year; suggested revolving fund or learning fund donation. Clearly define what the money is to be used for and deposit money into a bank. Money could be directed to research, database development, etc.
- Combine funds for a specific job because agencies would provide more support if the money was set aside for a specific project.
- Publicize the effort.
- Create franchise approach by which agencies with a particular expertise (environmental, regulatory, health, education) could come together and sell their knowledge and services to help other agencies as the private sector and vendors often do.
- Look at fee-for-service models, including those of the National Science and Technology Council, EPA Office of Compliance, and Technical Assistance Centers, where intermediaries provide service for people and industries/sectors.
- License contractors so that vendors could put money into our pool that we can then use.
- Build partnerships—a mechanism to bring partners together around shared needs, shared interests, and shared abilities; no one group will have to come up with all the money. Common interests are made aware.
- Need seed money to get communication mechanism working.

Federal Centers of Excellence and Learning Technology Resources. Ms. Doroshaw also handed out a resource entitled *Federal Centers of Excellence and Learning Technology Resources*, which contained agency listings and the resources and centers of excellence available through them. Additional information on the various topics may be available through the Office of Personnel Management Main Street Electronic Bulletin Board at (202) 606-4800, Forums/Training Forum/HRD Information, and through the National Technical Information Service (NTIS) FedWorld/HRDC Training Mall on the Internet at <http://www.fedworld.gov/training/>.

Justifying Your ProjectJustifying Your Project

Presenters:

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Steve Larkin, IVT Project Manager, Advanced Technology Department, School of Information
Technology, Internal Revenue Service

Phone: (703) 308-6068

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Information Technology, Internal Revenue Service

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Session Overview

These sessions reviewed appropriate strategies for justifying programs that utilize information technologies in a training environment. The Advanced Technology Department is now in the process of doing this for the Internal Revenue Service (IRS), a large organization with many employees (including temporary ones) that has been undergoing considerable internal reorganization and downsizing. Justifying programs to develop a better way to train is not done in a vacuum in the IRS and requires definitive cost data. The IRS is compelled to reduce discretionary costs, including training, as a result of budget reductions, yet the ongoing restructuring obliges an increase in organization-wide training.

Why IVT? To deal with this quandary, the IRS needed to develop a better and more efficient way to train in order to do more with less. Traditional “train-the-trainer” methods are expensive and relatively unresponsive to rapid dissemination of changes in material such as tax laws. The concept of the IRS University, while it improved the quality of training, was found to be still very expensive in that it required individuals to physically travel to training sites. Therefore, the IRS began to do a considerable amount of justification work on distance-training capabilities, especially interactive video teletraining (IVT), to train a geographically dispersed workforce while reducing dependence on travel to centralized facilities.

Appropriateness of IVT. The issue is whether and what IRS material is appropriate to IVT, which consists of one-way video broadcasting out over satellite and two-way audio broadcasting affording contemporaneous communication between instructor and student. Part of the process of assessing IVT’s suitability is determining which and how many courses and topics best fit into an IVT context. Most instructor-based courses lend themselves to IVT technology: training in procedures is ideal for IVT, whereas courses with much workgroup activity do not fit as well conceptually.

Advantages of IVT. Advantages of IVT include the following:

- University professors who are partners with the IRS, as well as experts and regulators who are IRS employees, can be leveraged more readily and broadly with IVT. Therefore, the quality of instruction should improve.

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- Consistency and standardization of training is maintained; there is no “draw-down” effect.
 - Broadcasting training directly to where personnel work makes their participation more likely, as they do not have to take time out to travel to a course.
 - Opportunity costs are reduced, as are the direct travel and per diem costs.
 - Training, including updates on regulations, can be distributed much more rapidly—a very important issue with the IRS, in that tax laws are subject to considerable changes in October that need to be disseminated by the following January. IVT speeds this delivery along.

Process for justifying. To defend large systems expenditures, the Treasury Department has instituted a process of evaluation. Its foundation is a Requirements Analysis Package, which establishes guidelines for analyzing business requirements, their associated costs, and alternatives. The standard requirements-analysis document used by the IRS in justifying programs is the U.S. Treasury 83-01 Document, which defines components for justifying programs. A key component is the cost-benefit analysis (CBA). Part of the justification process is an assessment of alternatives—continue to do resident-based training; use and build upon the capacity inherent in the IRS-owned IVT system; or rent IVT sites from a third party—and these alternatives were costed and then compared to the program being proposed.

The IRS now performs more than 400,000 hours of classroom training. More than half of the organization’s training budget now goes to travel and training-related travel. Finding a way to reduce these costs not only promotes direct savings but also enhances the efficiency of personnel by freeing up the time spent on travel to training sites to allow for more time spent performing their jobs.

The IRS currently rents a shared uplink site through US Sprint, which has been used for management communications as well as 79 downlinks located at various IRS sites nationwide. This system is two-way audio, but not two-way video. One of the alternatives considered was to increase the number of downlinks in this network to 230 either through capital investment or through renting or leasing the sites.

Cost-benefit components. Some of these are based upon hard data and relatively easy to determine, such as transmission, downlink, and maintenance costs. Other costs are less obvious. As this industry is new, standards are still under development and subject to challenge. A simple CBA generates a common-year funding by net present value, a figure that is not always clear. The IRS can get a fairly accurate measure of training travel and per-diem cost savings, as well as of student- and instructor-salary cost-avoidance savings. But opportunity-cost savings are more difficult to predict. Nonrecurring costs are hardware and software expenditures (one-time purchases). Recurring costs, which over the long run become the predominant costs of a program, are more difficult to measure.

Controversial CBA variables. These components are particularly challenging to define and can have great impact on the cost-benefit ratio:

- *Training load.* Before doing any analysis, a true baseline cost needs to be established, but this determination can be difficult. The Media Selection Model was used to determine possible IVT percentage to the overall training load. Data collection methods were different—collected by day prior to 1995, then collected by hour—and these differences were worked out in the analysis in terms of what were reasonable, and not reasonable, components to generalize.

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- *Course length.* Defining course length was not as obvious as it might appear. Surveys of how much time people actually spent on a course generated a widely fluctuating range of figures. A statistical analysis that disregarded the outlying data points was performed. Instructors have a lot of flexibility on how to teach their courses, and this contributed to the variance in the numerical figures on course length. A course is often customized to the region in which it is taught, and this can influence the course length as well. If the only source of data had been the figures provided in the course catalogue, a significant understatement of course length would have resulted. The important lesson here is that when a database is analyzed, the components of that data need to be well understood.
 - *Student throughput per IVT course.* This variable (how many students watch or participate in an IVT broadcast) had a tremendous impact on the cost-benefit ratio. Audience size can vary greatly. This issue needs to be carefully analyzed when deciding on how to teach the course and how to use this media to do so. The number generated is subject to a sensitivity analysis. The ideal level of interaction in an IVT course still needs to be determined, as does the appropriate mix of instructor lecture and slides and video. A University of Wisconsin study suggests that an interactive component needs to be introduced into an IVT course every 5–7 minutes to perpetuate audience attention.
 - *Course compression factor.* Course lengths can get shrunk by using IVT. The question is by how much—a very controversial topic. Breaks can be truncated, slides can be preprogrammed to flash up, and factors in the media itself force compression of time. Compression factors vary from 20 percent to 80 percent, depending on how structured the course is, how much interaction is allowed, and whether workshops are separated out from the course. Implementation of the course has a great effect on the course compression.
 - *Course conversion costs.* As Government agencies convert more procedure-based training to IVT, more and better data on these costs will become available. Individual agency requirements and specifications have a tremendous impact on how this technology will be used and the costs subsequently entailed: whether new courses will be converted, whether the courses are up to date at the time of conversion, what level of graphics and video will be used. Other factors influencing costs of conversion include the scope of interactivity and the distribution of preprinted guides. Course conversion is almost never a straightforward process but, rather, involves modifications of the original class. From the limited course conversions performed so far by non-IRS agencies, the costs of conversion have ranged widely from \$15 per hour to \$15,000 per hour. Assessing course conversion costs comes down to a course developer's decision on how radical the change should be in course content and format. Discovering multiple uses for multimedia graphics can make their use more cost-effective. A group in the IRS's communications unit produces videos, including public service announcements. In addition, a segment in the IRS's School of Taxation (based in Kansas City) builds stand-alone, computer-based multimedia graphics. IRS is focusing on how to reduce costs by using expensive slides in multiple presentations.

Plans for implementation. To implement the IVT environment, the IRS has modernized its satellite transmission system and established standards for course conversion.

The IRS plans to develop an instructor corps of approximately 850 people, serving a training personnel base of approximately 90,000. The IRS has developed courses directly for satellite broadcast and is adapting training to IVT.

Currently, the IRS is conducting a pilot process, deciding initially what candidates for conversion should look like, what level of quality these courses should achieve, and what embellishments these courses might require. The aim is to produce a product that is not so deluxe that it will draw attention to itself, but is effective enough to hold student attention. A preliminary assessment will be generated and a feedback loop established. Cost estimates will be fine-tuned, as will be the process of estimating costs.

Lessons learned. These include the following:

- IVT has received some bad press, and so justifying it to the same level takes more effort now than it did before, as “the bar has been raised.”
- In justifying IVT, it is vital to sell the concept to everyone as soon as possible. If a detractor cannot be swayed by the facts, then maybe IVT should be reconsidered as an appropriate solution. Clients need to understand and support the business case.
- A clear mission statement needs to be established.
- All the variables plotted into the CBA need to be carefully scrutinized.
- IVT industry standards can act only as guidelines.
- Oversight agencies and stakeholders need to be fully involved in the process.

Discussion

The following is a summary of the discussion after the presentation:

- To convince management that the justification is done objectively, it is important to provide significant background data on every assumption and to clearly identify the variables for which assumptions are established.
- The fundamental goal of the IRS, as articulated in the mission statement, is not to develop more effective training but, rather, to develop equally effective training at a lower cost. The pilot courses will establish an organized measurement mechanism that will facilitate changes in training as well as identify sound decisions made. IVT is not viewed as a means of improving the quality of training, but as a means of providing quality training to a much larger audience that might otherwise not receive training due to decreased training and travel dollars.
- To verify the high quality of IVT training, numerous studies have been conducted that have found equivalent training results with the use of television as opposed to the classroom setting as training media. This format is obviously not applicable to all training material; laboratory work and training in teamwork is not as effective through IVT. Course objectives are carefully considered before nominating those classes as candidates for conversion to IVT.
- Use of IVT does reduce the autonomy of instructors to teach courses the way they want, and therefore represents a change in the culture of the IRS training organization.
- Currently, indicators for assessing course effectiveness are inadequate.
- The goal of training remains for the student to acquire the knowledge and skills necessary to perform his or her job, although people have been known to sign up for training for other reasons. IVT is not designed to address the issue of training as a morale builder.
- Old Dominion University has a “Two-Plus-Two” program on distance learning, from which the IRS has learned much.

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- The Government Alliance for Training and Education (GATE) is a consortium of 30 Federal agencies working together to gather data. GATE consists of 12 uplinks and will have a network of 1,200 downlinks shortly.
 - During this symposium, Maj. Rick Gividen presented information on Federal agencies sharing database resources, “Distribution of Distance Learning Resources.” The Veterans Administration, the Social Security Administration, and the Federal Aviation Administration have all been converting courses, and the IRS accessed the data on these conversions.
 - When the IVT system was designed, it was not intended to take control away from a course’s instructor, who will be involved in course conversion decisions. An instructor can select a particular medium with a one-touch viewer-response system to allow him or her to control the course and the medium used during the course.
 - The Requirements Analysis Package comes from TD 83-01. It is a regulation on how requirements should be written up and includes predocumentation.
 - This CBA will be finalized shortly. The break-even point for IVT will be identified; because the IRS has an existing infrastructure in place, capital investment does not have to start from ground zero.

Developing Specifications and RFPs

Presenter:

Wilson “Chip” Summers, Associate Dean for Academic Programs, Defense Systems Management College

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Session Overview

This session explored solicitation and ways to improve its effectiveness for ensuring that the Government obtains sound instructional technology products.

The manner in which the Government conveys its requirements to contractors forms the cornerstone of the acquisition system. It sets the stage for all other events in the acquisition process. The quality of the contractor’s proposal is directly related to the quality of the Government’s solicitation. An inadequate solicitation will result in an inadequate proposal, which leads to an ill-defined contract, which results in contract changes, claims, overruns, schedule slips, terminations, and product dissatisfaction.

One of the ways in which Government is working to create a more effective acquisition process is the enactment of The Federal Acquisition Streamlining Act (FASA) of 1994. The FASA makes extensive changes to Federal procurement law, thereby streamlining an extremely complicated and confusing acquisition process.

Acquisition planning and market analysis. Thorough acquisition planning and market analysis will help Government agencies produce solicitations with specific, identifiable requirements. FASA simplifies procedures to assist agencies in their acquisition planning and market analysis by—

- Establishing a preference for the purchase of commercial items. “Commercial items” are defined broadly to include products customarily used by the general public, certain commercial services, and products based on evolving technology that may not be currently available in the commercial marketplace. Commercial purchases include only those clauses that implement provisions of law or executive order applicable to the acquisition of commercial items or determined to be consistent with customary commercial practices.
- Exempting purchases with a threshold of \$2,500 from certain procurement requirements. “Micro-purchases” allow program officials to make purchases with a threshold of \$2,500 through the use of a commercial purchase card. Agency heads are encouraged to delegate micro-purchase authority to individuals who will be using the supplies or services.*
- Establishing “FACNET,” the Federal acquisition computer network architecture, which, when practical, will be used for all phases of the procurement process from notice of solicitation through award and payment for acquiring supplies or services exceeding \$2,500 but not exceeding the simplified acquisition threshold. Some agencies are currently conducting procurement activities on FACNET.*
- Establishing a “Simplified Acquisition Threshold” of \$100,000. Prior to FASA, Federal agencies could use small purchase procedures (e.g., a less complicated process for soliciting

and evaluating bids) for purchases of \$25,000 or less. FASA expanded this authority by permitting agencies to use simplified procedures for procurements up to \$50,000. The threshold may be increased to \$100,000 for agency components that have been certified at having interim FACNET* capability. Simplified acquisition procedures are to be used to the maximum extent practicable for all purchases of supplies or services not exceeding the simplified acquisition threshold.

Notices of procurements of up to \$100,000 will not be required to publish in the *Commerce Business Daily* (CBD), where specified functions are conducted through FACNET. In addition, notices in the CBD will not be required for procurements up to \$250,000 after Government-wide FACNET* has been certified.

- Contracting by negotiation (requiring the use of an RFP) through either “full and open competition,” “full and open competition after exclusion of sources,” or “other than full and open competition.”

Defining requirements/specifications. To properly respond to a solicitation, the contractor must understand what the Government is trying to buy. The contractor’s response to a solicitation depends greatly on whether or not the Government has adequately defined its requirements.

- *Work Breakdown Structure (WBS).* A WBS provides the framework for structuring and defining the total project or program (e.g., equipment, services, and other items that make up the project). The WBS provides the basis for progress reporting, performance evaluations, and financial data reporting. The WBS becomes more detailed as the system definition and acquisition advance. Each phase of the WBS must be in sufficient detail to cover all work required in that phase. The WBS is used in developing the Statement of Work.**
- *The Statement of Work (SOW).* A well-written SOW forms the basis for successful performance by the contractor. The SOW should specify in clear, understandable terms the work to be done in developing and/or producing the products and/or services performed by a contractor. An SOW prepared in precise terms facilitates the acquisition process in the source selection process, and contract administration afterward.**
- *Performance specifications.* Performance specifications, as opposed to detailed specifications, state requirements in terms of the required results and provides criteria for verifying compliance, but they do not state methods for achieving results. More and more, contractors are given the charge of stating the methods for achieving results. This expedites solicitation development and introduces innovative solutions to the Government.***

Solicitation structure. A standard, uniform solicitation structure exists for all solicitations issued. Federal Acquisition Regulations (FAR) prescribe this uniform format; the use of the format facilitates preparation of the solicitation and response from the contractors. The format is outlined below:

PART I—The Schedule

- A. Solicitation/Contract Form
- B. Supplies or Services and Prices/Costs
- C. Description/Specifications/Work Statement
- D. Packaging and Marketing
- E. Inspection and Acceptance
- F. Deliveries or Performance

-
- G. Contract Administration Data
 - H. Special Contract Requirements

PART II—Contract Clauses

- I. Contract Clauses

PART III—List of Documents, Exhibits, and Other Attachments

- J. List of Attachments

PART IV—Representations and Instructions

- K. Representations, Certifications, and Other Statements of Offerors
- L. Instructions, Conditions, and Notices to Offerors
- M. Evaluation Factors for Award

Request for Proposal (RFP) process. The RFP process is vastly improved as the acquisition process is streamlined to allow for a more agile, flexible, and timely acquisition process. Some of the changes that have directly affected the RFP process to create a more efficient, effective, and expedient RFP development are—

- The use of electronic commerce by Government agencies to obtain feedback on draft RFPs.
- The RFP Cross Reference Matrix, which is intended to reduce internal RFP inconsistencies in proposal preparation.
- Internet and library resources made available to contractors so that they become more knowledgeable about the requirements.
- The use of past performance data to verify a contractor's ability to provide quality services and products.

Recommended Reading

**Federal Acquisition Streamlining Act (FASA) of 1994, Public Law 103-355.* U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954. Highlights of FASA.

Federal Acquisition Regulations (FAR). U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954.

***Military Handbook, Preparation of Statement of Work (SOW).* U.S. Department of Defense. June 1, 1983. Refers to the Military Handbook, Presentation of SOW.

****Performance Specification Guide.* Chief, Standardization Program Division, 5203 Leesburg Pike, Suite 1403, Falls Church, Virginia 22041-3466. Refers to the Performance Specification Guide.

State of Internet DistributionState of Internet Distribution

Presenters:

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Session Overview

In this session, attendees learned how to use the Internet as a communications tool with their field staff, constituents, and the public. Presenters used an overhead projection of the Small Business Administration (SBA) Web site, SBA Online (<http://www.sba.gov/>), as a visual aid and framed their discussion with four primary points:

- Services offered.
- SBA Online today.
- Lessons learned.
- Where SBA is headed.

By learning more about the design and goals of the SBA Web presence, agencies may better evaluate their own needs and goals as they look into establishing or modifying their presence on the Web.

Services offered. SBA offers a wide variety of services and information to both external and internal audiences. First appearing on the Internet via gopher, SBA's current presence on the Web can be found at <http://www.sba.gov/>.

External Information

Public information on SBA's site is divided according to three primary issues:

- Starting a business.
- Financing a business.
- Expanding a business.

Each of these categories offers a variety of related links. Users should visit each page for details. Generally, all sites should be designed to answer the basic question, "Who are your customers and what do they want?"

In the case of SBA, customers are small business owners who want information and assistance for running their businesses. Often, their informational needs can be met through access to publications or databases, or by following links to other, useful sites that are cross-referenced on SBA's site. Users who need personal assistance may complete a form online (in Adobe Acrobat) and await a call from a Service Corps of Retired Executives (SCORE) representative for a free counseling session.

Links should provide useful information. Under the category Starting a Business, users will find links to 31 frequently asked questions; guidelines for developing a business plan; access to helpful shareware for business and career planning; as well as use of reference material at the Library of

Congress.

Other useful sites posted by SBA include the following:

- International trade.
- Women in business.
- Area SBA offices and services.
- Public services.
- State/city information.
- Great business hotlinks.
- Resources for public service.
- Current issue of the *Commerce Business Daily*.
- Employment opportunities.

In addition, SBA's site offers users information on electronic loan programs and regulations and notices regarding the 504 loan program.

Internal Information—"The Intranet"

SBA also uses the Internet for internal, Agency communications. Agencies may consider establishing similar "Intranets" as cost-effective ways to communicate with field staff. These systems are password protected, and they offer a cost-effective, secure means of communicating with staff quickly and over a vast area.

Applications for such networks include—

- *Internal training.* Publications and materials distributed electronically save time and money in production and distribution costs.
- *Routine communications.* Information on awards, calendars, job announcements, telephone books, and other news items may be disseminated rapidly and inexpensively.
- *Reference guide online.* Computer user services—roll out new office suites. The guide is designed to help end-users answer their own questions regarding technology and the application of software.
- *Training opportunities.* Users may access course descriptions, take computer proficiency exams to determine the level of training they require, and even register for courses. This resource frees technical staff to work effectively on large-scale, proactive projects.

SBA Online today. SBA's Internet presence started as an internal bulletin board for internal documents such as budget analyses and spreadsheets, and it has grown to play an important role in day-to-day functions, from the sharing of news and information among its 80 district offices to acting as a technical support resource for software training.

At the outset, Sprint donated toll-free telephone lines for an estimated \$50,000 per year. Soon after the board was established, the lines were costing Sprint \$150,000 per month. This remarkable use of the electronic bulletin board system (BBS) gave rise to requests for electronic access to SBA publications and databases from both SBA field personnel and the public.

One of SBA's first uses for the BBS was a partnership with SCORE, an organization that provides training courses for small business owners. Via the BBS, SBA linked users with SCORE group

forums on topics such as computers in small business, agricultural business, and running a home-based business. SBA's step-in electronic communications offered users access to Internet E-mail. Users could call SBA's 900-access lines, which charged callers 14 cents per minute. Callers using the system could download 200–300 messages in less than a minute and hang up. Offline, users could read and respond to mail, and then dial in again to post their own mail. SBA research showed that for most callers, use of the 900-number was cheaper than a call to SBA's headquarters in the 202 area code.

Lessons Learned

SBA learned several valuable lessons over the course of developing its current Web presence.

Instill ownership. To avoid stagnant or dated information on the page, agencies should consider posting a photo of, and information about, the director of the agency on the Web page itself. This addition provides the Web site with a “fingerprint,” linking the site maintenance to a person. That person will likely feel responsible for the quality and timeliness of the information presented on the page.

Standardize graphics. Time delay caused by the desktop computer is the single biggest barrier to effective use of the Internet. Many desktop units cannot process complicated graphics and large images. Therefore, agencies should adopt agency-wide standards for graphics and Web site development. This step not only establishes unity in presentation of information, but it also helps to ensure the development of sites that users find helpful and easy to negotiate. The basic question to ask when developing a site is, “Who are my customers and what do they want?”

Consider security. Agency security personnel should be involved with the development of Web sites. Input from officers helps ensure that information not meant for public access is protected. While most companies break even in Internet commerce, security remains an issue. SBA staff note that it is safer to send credit card information over the Web than it was even 6 months ago.

Valuable links. Some feature links are rapidly becoming standard items on many home pages. These links include browser capabilities, frequently asked questions (FAQs), a search engine, and “What's New”—information that has been added recently to the site. These feature links allow users faster, more direct access to the information they are seeking from a page. They are valuable in helping users recognize the value of a site. This recognition will help encourage users to return to a page for related information.

Linking valued sites. Federal agencies tend not to link with commercial sites for fear the link equates a Federal endorsement of the company or product. SBA adamantly does not endorse the products and or services on linked sites, and the Agency's disclaimer says so. But small business owners can use the SBA information. Records show that SBA Online receives 450,000 hits per week, mostly from the commercial world. Provided the Agency staff hold no stock in a company in question and adhere to internal guidelines, SBA links users to sites believed to provide accurate and useful information. The ultimate goal is to provide users with the best information available. Often, commercial sites provide it.

Where SBA Is Headed

SBA continually updates its Web site. Some changes to look for in the near future include the

following:

- *Real-time information exchange.* SBA is investigating the possibility of providing instantaneous responses to public inquiries.
- *Further developing the Business Advisor.* This online publication was initially designed to help inform users about business regulations. It is developing into a much more sophisticated communications tool.
- *Online catalog.* The catalog provides users with sites that allow them to purchase products that help them develop and maintain thriving businesses.
- *Standardization of software.* With the Agency-wide installation of Microsoft Office software, SBA will post help manuals on the Intranet to assist in the streamlining of information exchange.
- *Building SBA reference guide.* This site is intended to house items such as the SBA memo logo, the SBA notices template, and other administrative information.

Discussion

Virtual workshop. An attendee asked SBA personnel to discuss the merits of real-time, online communications. In response, SBA staff advised caution to agencies considering using this form of communication. While mail and bulletin boards serve real, constructive purposes, use of chat modes and instant messages are often difficult to monitor and direct toward business.

Often, chat modes degenerate into “bull” sessions, some of which may be inappropriate for posting on a Government bulletin board.

Media Selection Decision ToolMedia Selection Decision Tool

Presenter:

Jeff Kelly, Environmental Protection Specialist, National Enforcement Training Institute, U.S.

Environmental Protection Agency

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Session Overview

The NETI Media Selection Guide (MSG) establishes a logical decision-making procedure for selecting a delivery media for a new or existing training course. It is a software template that factors the strengths of different delivery media available for training. Elements used to achieve the objectives of a new or existing course (i.e., lecture, simulation, group activity, etc.) are put into the template. The output from the software ranks the best media for achieving the objectives of the course. This session demonstrated the application of the NETI Media Selection Guide and possible modifications for using it with a variety of courses.

Methodology. The MSG was developed to help NETI identify which technologies could be used to make NETI training more effective and accessible. The decision model breaks the course down into required elements. These elements are separated into criteria, and then rated and weighted according to each one's respective importance to the course. Available educational technology alternatives are then evaluated according to how each would deliver the course elements. This decision process comprises four components:

- Define the decision structure.
- Weight the criteria and rank the importance of each element.
- Review the results.
- Check the construct validity.

Of the alternative formats included in the MSD, Mr. Kelly noted that in most instances, traditional classroom instruction is rated as most effective. Video conferencing is often ranked second. A list of the alternatives currently in MSD follows.

- Computer-based instruction.
 - Intelligent tutoring systems groups.
 - Computer-based reference materials.
 - Computer simulation and gaming.
 - Computer-based case studies.
- Conferencing/Satellite (audio/video).
 - One-way video/two-way audio.
 - Two-way video/two-way audio.
- Other communications.
 - E-mail.
 - BBS.
 - Real-time, text-based discussion.
- Other.

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- Recorded video.
 - Traditional classroom instruction.

Summarizing the presentation, Mr. Kelly described a three-step process for evaluating alternative training technologies using the MSG:

- *Step 1:* Determine the required elements for each course by interviewing course instructors and stakeholders. Examples of elements to be reviewed might include technical content, time sensitivity of content, level of interactivity, or need for expert instructors.
- *Step 2:* Evaluate the importance of each element in relation to successful course delivery. Each element should be assigned a rating based on how important it is to the successful delivery of the course.
- *Step 3:* Evaluate how well various technologies deliver the course elements.

Discussion

Mr. Kelly had described bulletin board systems as “lacking the human touch.” When queried on this, he agreed that there are times when BBSs are an excellent alternative for maintaining student-to-student interaction for programs such as the Mind Expansion Course.

The review process for the weights given alternatives in the MSG was discussed. Mr. Kelly explained that Alanna Mitchell led a team of professionals at Walcoff & Associates, Inc., who developed the template. The weight assignment was intentionally subjective and subject to change.

The setup costs for MSG software are estimated at \$500. This figure is the cost of the operating software, Criteria Decision Plus, Version 1.1. The software, once purchased, can be applied to numerous decision structures. Several other software packages were evaluated in developing MSG, including the well-known Expert Choice.

Partnership Development Workshop (Part 1)Partnership Development Workshop (Part 1)

Presenter:

Dennis McDowell, Director, Public Health Training Network, Division of Media and Training Services, Centers for Disease Control and Prevention

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Session Overview

Mr. McDowell gave an overview of his presentation entitled “Building Strong Partnerships = Successful Distance Learning.” His objective was to help the participants develop a better sense of how to initiate and maintain successful partnerships for successful distance-learning. To do that, Mr. McDowell described why participants need to examine their attitudes about developing partnerships. He stated that there is a methodology by which partnerships are identified, initiated, and maintained. In order to get a firm grasp on this methodology, participants must understand the following:

- Why build partnerships?
- What are the benefits of partnerships?
- What are some barriers to forming partnerships?
- What are the characteristics of people who are successful partnership developers?

The importance of partnerships. Mr. McDowell reinforced the statement that partnership development is the key strategy of distance learning. He then involved the participants in an exercise designed to illustrate feedback and clarify attitudes by constructing lists of why partnership-building is essential to distance learning. These reasons included—

- Combining resources.
- Combining expertise.
- Expanding opportunities.
- Giving all parties a stake.
- Providing a more complete view of problems to be solved.
- Providing a more complete view of solutions to the problems.
- Providing opportunities to transfer knowledge and experience.
- Magnifying results through wider distribution.
- Increasing political leverage.
- Reducing redundancy.
- Saving money.
- Building alliances.
- Reducing turf barriers.
- Bringing together differing views.
- Resulting in a better end-product.
- Increasing likelihood of acceptance by customer and management.

Benefits of building partnerships. The list of *benefits* of building partnerships included—

- Agreeing upon management and approach.
- Reducing individual costs.
- Increasing likelihood of “buying into it.”

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- Increasing communication cooperation by partners on program.
 - Capitalizing on expertise of others.
 - Leading to other potential projects—"we" instead of "they" attitude.
 - Benefitting from lessons learned.
 - Learning from other peoples' experiences and mistakes.
 - Synergy.
 - Being able to do things otherwise impossible.

Barriers to forming partnerships. The list of *barriers* to forming partnerships included—

- Forming dynasties/fiefdoms.
- Differing opinions.
- Having power struggles.
- Losing control.
- Lack of information sharing.
- Fear of change.
- Lack of vision of what is possible.
- Time/money.
- Lack of knowledge/skills on how to develop partnerships.
- Having too many people, which increases the difficulty of reaching consensus.
- Lack of trust.
- Lack of resources.
- Equal or unequal treatment of group members.
- Acceptable/unacceptable exchange of information.
- Different ways of doing business.
- Language and cultural differences.
- Not working together.
- Partnerships outside the chain of command.
- Lack of administrative support for partnerships.
- Lack of incentives/rewards.
- If successful, you may lose (money may go elsewhere).

Characteristics of successful partnership builders. Characteristics of people best suited to develop partnerships include—

- Trustworthiness.
- Reputation.
- Sense of humor.
- Willingness to learn.
- Problem solvers.
- Cooperative.
- Good communicators (networking, schmoozing, listening).
- Humility.
- Salesperson (knowledgeable, persuasive, confident).
- Giving of credit to others.
- Self awareness with respect to strengths and weaknesses.
- Perspective taking.
- Willingness to share work and glory.
- High energy, enthusiasm.

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- Visionary (an emphasis on the “big picture”).
 - Good facilitator.
 - Persistence and patience.

Mr. McDowell then shared the formula for partnership development:

For two or more groups to form a partnership, they must have similar goals and dissimilar resources. The stronger the reason to work together (goal) and the more different the resources, the more likely their partnership will be successful.

If potential partners share common resources, they will compete for visibility and viability, and their resource base will not be expanded. He compared partnering to a football team. Everyone on the team contributes a different talent to achieve a common goal. The same holds true for successful partnering.

Three ingredients for successful partnering—prepare, negotiate, and act. Mr. McDowell then discussed three criteria necessary for building strong partnerships: Preparation, negotiation, and action. He said every partnership is needs-driven, and once a need is established, you must do things to prepare such as identify the distance-learning problem you wish to solve, think about goals you might have in common with potential partners, prepare a priority list of potential partners, brainstorm about how you could work together with each one, and gain administrative support within your organization for initial priority partnership.

Once contact is established with a potential partner, negotiation is the next step. The three most important steps to negotiating include honest communication, the ability to listen and be flexible, and developing a partnership plan of action that includes a common goal, who, what, when, and how.

Lastly, you must act. Do what you commit to do and talk and visit as often as you need. Also, remember what it means to be a partner; don't take without giving. Don't give anyone the blame. Share new ideas, information, and resources.

Mr. McDowell concluded Part 1 of his presentation by tasking each of the group members with an exercise to think about for their particular agency. He first asked each person to identify and write down a need he or she has. He then asked the participants to think of an agency/partner that might help them meet that need. Next, he asked them to identify one reason why this potential partner would want to work with them. Finally, he tasked each participant with listing a barrier that may be encountered from working with this partner, and to attempt to overcome it.

Making Investment Decisions: Estimating the Return on Investment

Presenter:

Robert Rovinsky, Ph.D., Manager, Strategic Investment Analysis, Federal Aviation Administration
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Session Overview

This session focused on the lessons learned from recent Federal Aviation Administration (FAA) cost-benefit analyses of interactive video teletraining (IVT). Cost-benefit analysis (CBA) is a key component in the process of justifying investments from the Federal budget, in terms of a project's anticipated economic return. Dr. Rovinsky began by saying that the idea of the intrinsic benefit of training is so accepted within the training community that it can be difficult for them to assess a training program's actual cost benefit and enhancement of mission need. In analyzing a program's economic viability, therefore, factors to investigate include not only the organization's requirements and mission need but also the operational impact of the program—an element particularly important to the FAA. Dr. Rovinsky directs an office that is responsible for reviewing all new FAA projects from a CBA perspective; the office is independent of the FAA training arm. Most new FAA projects are not involved with training, but deal with new technology to be inserted into the National Airspace System.

FAA training environment. As with other Federal agencies, FAA's funding is being reduced, which has an obvious impact on training resources. Meanwhile, aircraft operations are projected to increase. The FAA provides training in procedures and in security and airtraffic regulations, and in management, for airtraffic controllers and maintenance personnel. IVT was intended as a vehicle to limit travel to training sites, as well as to reduce the long intervals of residence often required at those sites during the courses.

OMB guidance defines a CBA's purpose as "analyzing the relationship between the life-cycle cost and operational effectiveness of a technically feasible concept," with life-cycle cost defined as the total cost of building, maintaining, and disposing of a acquisition over the entire life of that investment. Life-cycle costs include research and development, capital investment, and operation and maintenance. For IVT, a life cycle of 10 years was assumed.

Why do a CBA? In performing a CBA in the FAA, a project can go through as many as to seven separate review cycles. Assessing the potential economic payoff for a project often leads to a reconsideration of the real need for an investment. No CBA is done without providing alternatives to the program under review. CBAs also document acquisition decisions and promote better communication with the aviation community. In doing CBAs, costs are always easier to assess than benefits. A key element of CBAs is the sensitivity/risk analysis, which is particularly important to training.

FAA acquisition process. Derived from FAA Order 1810.1F, the acquisition process has traditionally had four decision points after the definition of the mission need: (1) exploring the concept and its alternatives, (2) performing a demonstration/validation, (3) deciding on acquisition leading to full-scale

development, and (4) deciding on acquisition leading to full-scale production. A CBA is performed at each of these stages and, contrary to the ideal, often at each stage of decision and review, costs are found to increase while benefits are found to decrease. The FAA is now streamlining this acquisition process to two stages. CBAs take a while (usually at least 3 months) because numerous components need to be defined and quantified, and much coordination must be done. In previous years, the FAA has performed more than 200 CBAs or similar analyses annually.

“The color of money.” Money for training can come from either the operations budget or the capital investment budget. At the FAA, the tendency is to pay for training, at least initially, out of the pool of capital investment, because training is often about the new technologies that are coming online. Historically, the “pot of gold” at the FAA is located in the capital investment plan, where the organizational funding flexibility historically resides. Conversely, the supply of operation and maintenance funds are much tighter. In funding IVT, therefore, the program manager decided to bid for FAA’s capital investment fund, which meant defining and justifying IVT as something new that would improve the existing infrastructure. This meant that a large part of the justification was based on a determination that 16 percent of FAA’s courses would be candidates for conversion to IVT. Ironically, the largest benefit of IVT comes not from course conversion but from direct development of a course into the IVT format. IVT would have been ineligible for capital investment funding, however, if justified that way.

Benefit elements. Benefit elements are defined on a life-cycle basis and divided into two categories: benefits that come back to the Government in terms of reduced costs, and benefits to the users (airlines and the traveling public). Much FAA training goes to non-FAA personnel (which is not the case in most other Government agencies), such as local airport employees and enforcement officials, and so a significant potential exists to capture user benefits from new training technologies.

CBA products. The statistical components of a CBA are its net present value; the benefit-cost ratio (where a figure of less than one means a program should not be funded from a cost-benefit point of view); and the break-even point, which anticipates at what point in the future constant benefits will equal constant costs. Present value is the value of costs and benefits viewed from the present, and it deflates figures in out years. Other, and often overlooked, components of a CBA include politics; program risks (such as technical, schedule, funding); and affordability, which includes an apprehension of what will be truly affordable over the entire life cycle of a program.

IVT. Unlike traditional distance learning through television, IVT technology—which is well understood, fairly advanced, and successfully used by some corporations—allows an instructor to receive constant feedback from students and to choose whether or not to respond. A charismatic instructor in a classroom setting does not necessarily make for a charismatic television personality; a superior distance-learning concept incorporates, nonetheless, a compensatory instructional design aspect. Although IVT has been found to be less effective for courses incorporating a high level of interactivity, it has been shown to be a superior tool for delivery of courses on procedural material.

FAA culture. Training reflects the culture of an organization. The FAA is driven by high-tech programs and very aggressive program managers dedicated to new concepts and technologies. FAA program managers have a great deal of confidence in their new concepts and are very ambitious in promoting them. To balance out and, if necessary, check this dynamic of organizational and personal enthusiasm for new programs and technology, the FAA created an independent cost-benefit analysis

branch.

History of IVT in FAA. The IVT program, over its life cycle, was costed at \$50 million. IVT program managers initially supplied their own cost-benefit analysis, which was reviewed by Dr. Rovinsky's department and found to be in noncompliance with Agency standards. The CBA's data were therefore checked and revised to meet the Agency's standards, and the CBA was then approved. Subsequently, the IVT program went on to the next stage of development.

Problems. As the IVT program approached the demonstration/validation phase, some concerns were raised by the FAA's Inspector General (IG) office. The IVT program had been justified by its promise to realize considerable savings in travel and per-diem costs. To persuade instructors to offer themselves and their courses as candidates for conversion to IVT, the program manager had offered to pay for course modifications, updates, or embellishments that the course instructor might have desired. These costs were not considered part of the initial CBA, but they were added into the revised analysis of the IVT program by the IG. As a result, the IG found that the initial estimated conversion cost figures provided by the program manager had fallen considerably short. The IG also found problems with the compression rates posited by the program manager, argued that compression rates should be zero, and noted differences in the evaluations of the courses. As a result of these findings, the IG recommended canceling the IVT program on the basis of its cost benefit, which was significantly diminished by the IG's analysis.

Because the training budget for the FAA was shrinking while its training needs were increasing, IVT was identified as a possible solution to the problem. The FAA established as a management goal that 16 percent of existing classroom courses would be converted to IVT; this figure, as an aggregate, had been factored into the cost-benefit analysis. No specific courses, however, had been characterized as conversion candidates, and when actual course candidates were suggested, these decisions were subject to considerable resistance. The IG remarked correctly that, as a result, an economic analysis could not be based upon a general management goal. Therefore, the original mission need analysis was flawed.

Revising the CBA. The FAA agreed to repeat the CBA, using more conservative estimates, assuming two broadcasts per IVT course, and factoring out new courses. The assumptions included an elimination of travel and per-diem costs, a compression factor of 25 percent, and estimates on the number of students. These assumptions were validated through data from the demonstration/validation as well as data gathered on uplinks, downlinks, studios, benefits, and course compression. A full gamut of analyses was performed, including net present value, cost-benefit ratio, break-even point, and risk/sensitivity. The cost-benefit ratio went from 2.54 to 1.66, and the break-even point was determined to be the year 2001. The revised CBA was reviewed by several different offices, including the IG and the FAA's Program Analysis Office and its Internal Auditor. The IG's office was still dissatisfied with the CBA, however, and found considerable problems with the CBA figures.

Solid evaluation data on IVT are difficult, as classroom-based evaluations tend to be negative. However, the literature on IVT indicates it is effective as a vehicle for teaching procedural material. Delivery of IVT remains a problem. In responding to the IG, Dr. Rovinsky's department unsuccessfully sought specific responses from IVT sponsoring organizations on course conversion candidates. Therefore, in providing the revised CBA, the analysts added a caveat that all interested parties had not signed onto it. In revising the CBA yet again, this input from management will be

needed to secure a cost-benefit ratio that is greater than one.

In summary, the IG's response to the CBA was as follows:

- The program office would not convert as many courses as it had claimed. (In this, the IG was probably right.)
- Course compression was overestimated. (This point is more debatable.)
- Conversion costs were underestimated.
- Student scores and travel from the demonstration/validation were misrepresented.

Responding to the IG. The IG's comments were incorporated into the CBA, industry representatives were asked to assess the concerns raised, and the Federal acquisition executive asked for yet another evaluation of the IVT program. A sensitivity analysis emphasized the importance of compression rates. The real benefit for IVT could be for new courses; IVT can be a superior way to train people in the new ways of doing procurement. The Defense Acquisition University (DAU), for example, is doing many broadcasts on acquisition reform. Nonetheless, the business case for IVT has yet to be thoroughly made.

Lessons Learned

Among the lessons learned are the following:

- Sponsorship support is absolutely necessary—from the top management down to the sponsorship chain and to the training personnel. Management goals must be grounded in specifics.
- It is important to support the CBA findings by using outside sources to validate information and to gather data.
- Recognize that training reflects the culture of the organization. The problems encountered with IVT reflect FAA's program management style.

Discussion

The following is a summary of the discussion held after the presentation:

- The IVT proposed a one-way video and a two-way audio. IVT may not be the media of choice for courses on negotiating skills; the literature suggests that courses that teach procedural, regulatory, or acculturation topics are best suited for IVT.
- Several elements constitute opportunities for course compression from IVT adaptation. Breaks are kept to a minimum in an IVT setting. Courses are reengineered. The IVT technology allows the instructor the flexibility to present numerous data items at the same time through different mediums. Instruction from experts can be color-coded. Instructors do not need to repeat information.
- At this time, not much modeling has been done on the issue of compression.
- In doing long-range resource-management planning, a high-tech agency should plan on the potential impact of future budget cuts on its training program, and projected out-year funding should reflect this. An organization that invests in IVT should not plan on getting its money back in the short term.
- The true benefit of IVT is found when courses are developed directly into the medium and

when courses are created to address specific mission requirements. Converting courses into IVT is a two-step process.

- The IG's role is oversight. The IG's office did not provide estimates, but it did provide a strong opinion from a cost-benefit perspective that the IVT course, as currently constructed, should not be funded.
- Part of the problem was the dynamic where an optimistic, aggressive training office was combined with a general Agency-wide reluctance and a strong level of criticism from the IG's office. This is a cautionary tale for other agencies to remember when they advocate new technologies.
- The FAA does not generally do cost-effectiveness studies. Cost-effectiveness studies are best suited to missions that are clear-cut, which is not usually the case with the FAA.

Partnership Development Workshop (Part 2)Partnership Development Workshop (Part 2)

Presenters:

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Kelly Sauer, Consumer Safety Officer, U.S. Food and Drug Administration, CDRH
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Session Overview

Mr. McDowell reconvened the afternoon session by summarizing the partnership development presentation, reviewing flip chart lists, and reiterating the three keys to successful partnership building.

He then introduced the panelists who would be discussing case studies.

Case Study #1—"Partnership With the Private Sector"

Kelly Sauer, FDA

Ms. Sauer spoke of her role with FDA in the production of educational videos and satellite teleconferences and commented on some of the advantages to partnering. She stated that preexisting obligations and lack of time may become barriers to partnering. She also added that the benefits are all important because they center on sharing ideas and resources.

In Ms. Sauer's case study, the major players included the Food and Drug Law Institute (FDLI) and FDA. FDLI is a nonprofit educational association encompassing all FDA regulated activities. FDA is a regulatory agency consisting of supportive management and a large vocal industry constituency.

From FDA's perspective, the driving forces behind FDA's need for a partnership with FDLI included the numerous new regulations handed down from Congress, the urgent need to communicate with regulated industry, and the lack of staff resources directed to distribution of regulatory information. FDLI needed to expand its services to members, increase its membership base, increase access to FDA officials, and increase liaison with other associations.

Barriers encountered by FDA included legal issues, equity and competition, staffing shortages, funding, and required clearances. Similarly, FDLI's barriers to partnering included legal issues, the Board of Directors, staffing shortages, a steep learning curve (lack of experience), and funding.

Contributions made by FDA included providing content experts and liaison to the co-sponsor. FDA also provided the handout material, all television production staff, and the teleconference production

facility. FDLI supplied the satellite time and truck, the promotional flyer for advertising, reproduction and distribution of handouts, and recruitment of site coordinators. A troubleshooter, an evaluation, and a summary report were also contributed.

To date, FDA and FDLI have partnered on eight satellite teleconference broadcasts to regulated industry (more than 25,000 viewers). FDA received excellent response from industry and Congress as well as funding for three additional projects this year, awards, FTE support from the agency, and new clients. FDA employees also enjoyed the benefit of tuning into the broadcast. In return, FDLI appreciated increased service to members, increased membership, increased access to FDA, and increased interorganization liaison. In addition, FDLI received recognition and gained valuable experience in teleconferencing.

Discussion

The following answers were given to participants' questions:

- Costs of the teleconferencing effort were shared.
- The length of the broadcast was 2.5 hours.
- Costs were \$1,500 per hour for broadcasting.
- The teleconference broadcast cost less than \$15,000 per session.

Case Study #2—"Public-Sector Organization"

Jerry Oakley, EPA

Dr. Oakley began his presentation by discussing the creation and development of the EPA Safety, Health and Environmental Management Division's Multimedia Laboratory (MML). The MML was established approximately 3½ years ago and has been very successful. Initially, only EPA products and funding were involved. As products were developed and others became aware of MML's capabilities, an effort was made to make the products as "generic" as possible, thereby giving them greater applicability to both the public and private sectors.

During the past year, the need to focus on partnerships has become quite evident. Downsizing of the Federal Government has increased training demands for employees assuming new and/or greater responsibilities. At the same time, funding for traditional training has been severely cut. Agencies can no longer afford to independently develop and provide even the basic mandated training. Agencies must work together to make the best possible use of resources and to employ new technological applications for the development and distribution of training.

EPA's experience with partnerships has been very productive. MML is currently working on joint development projects with the U.S. Department of the Interior and the Federal Aviation Administration. The products from these projects will be used in both agencies and have enabled the creation of training products that would not have been possible by either agency alone.

MML employs an Interagency Agreement (IAG) to establish these joint projects. They recommend a somewhat general description of the overall project in the IAG, while still providing enough structure to adequately define the process and product. This will permit some flexibility in the development process (design, format, etc.). While the IAG can cover any time span, endeavor to be realistic when estimating the time required to complete complex projects ["it will always take longer than you think"].

If you are the agency doing the actual product development, it is essential that you and your partner(s)

have a clear understanding of what is to be done. In the initial meeting, try to arrive at a common “vision” of the end product. Also, make certain that the partners sign off on each significant phase of the project to avoid any surprises and dissatisfied customers at the end. On MML projects, partners are asked to sign off as approving at each of the following stages: content outline, storyboards, test modules, and final modules; they then serve as beta testers of the final project before the last modification. When the final product is ready, no one is surprised or disappointed, because they have played an active role throughout the development.

Communication can be a barrier to the timely completion of products. It is essential that the partners identify key technical contacts who can review material, answer questions, and make decisions promptly. Some of the early MML projects were extended twice because partners failed to be responsive. They now make it a condition of the partnership that such individuals are identified and are, in fact, responsive.

In conclusion, partnerships are a very mutually beneficial approach to creating and using new technology; they avoid wasteful duplication of effort and can result in tremendous cost savings to agencies. EPA is always available to discuss the possibility of establishing partnerships; inquiries should be directed to Dr. Oakley (Oakley.Jerry@epamail.epa.gov).

Case Study #3—“Distance Learning Network”

Dennis McDowell, CDC

Mr. McDowell began by explaining briefly the history of distance learning as it relates to CDC. He reported that CDC is celebrating its 50th Anniversary and has enjoyed its reputation as a mecca of public health information, knowledge, and know-how. However, in recent years, many programs conducted by CDC have not been as successful—in terms of reaching the desired audience—as in the past, when training was based on a classroom-only strategy. Hence, a new initiative called the National Training Network for Public Health was developed to meet the needs of the public health workforce. However, this initiative did not receive funding. For 3 years, the ideas were repackaged, but still no funding was received. Finally, a new approach was developed to build partnerships to leverage other organizations’ resources under the premise, “We do not have to own it in order to use it.”

The partners that were solicited to form the foundation of the CDC Public Health Training Network (PHTN) did not want to join CDC. Therefore, “CDC” was dropped to promote the idea of “ours,” not “theirs.” A network was designed to which participants could have access rather than their having to own it. Partnerships now included Federal agencies representing technology for production and delivery, academic institutions representing agencies possessing needs analysis and evaluation capabilities, professional associations able to promote and legitimize programs for their audience, State Departments of Health that represented PHTN’s initial target audience, and other foundations and organizations. Each of these partner groups was interested for their own reasons, but they share the common goal of improving workforce performance and the ability to share different resources.

Mr. McDowell emphasized the point of working together to ease the burden of responsibility of each partner. He then explained the worth of partnerships: They attract a large number of participants each year, 200,000 thus far, and they can be very cost-effective and efficient. A distance-learning coordinator has been established in every State. This person is named by the State Health Director at the State Health Department level to coordinate distance-learning programs. This creates a partner for PHTN to work with in every State. The result of these partnerships was the creation of the PHTN,

which has now offered several score of urgently needed courses to hundreds of thousands of workers by leveraging over \$100 million of existing human and technical resources.

In terms of selling ideas, partnerships should consider adding in other people's resources. To summarize, the mission/vision of PHTN is "Healthy People In A Healthy World Through Prevention." Partnerships produce not only many benefits but also tangible dollars.

Finding and Working With Contractors

Presenters:

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Session Overview

The session explored the life-cycle activities involved in identifying, selecting, and employing contractors to provide quality products and/or services to Federal Government agencies.

Reasons for using contractors. Changing Government needs, new political and economic realities, increased competition, a reduced workforce, reduced budgets, new enabling technologies, shifting public views and concerns, and new legislation and regulations are forcing Government agencies to procure training expertise from contractors.

As the nature of training evolves from classroom to advanced technology-based learning activities such as self-paced instruction, distance learning (satellite and Internet), and multimedia-based training, Government agencies, due to a reduced expertise base, must employ contractors to ensure that agencies not only receive relevant training, but also know how to properly use the training (e.g., self-paced instruction). By focusing on a wider range of methodologies—requirements analysis, benchmarking, rapid prototyping, instructional systems development, human engineering, and organization development, agencies can better define their training needs so that contractors can fulfill their requirements and provide successful end results.

How contractors should be used. Agencies must address the mixing of outside sources with inside capabilities. Outside sources (contractors) must assist agencies in (1) researching and developing new technologies that will allow the Government to keep pace with the ever-changing technology environment, (2) providing test and evaluation to ensure proper function and operation of newly introduced technologies, and (3) providing surge capabilities in times of crisis.

Locating candidate contractors. Agencies can find qualified contractors by talking to other Federal agencies/managers, small business advocate offices, contracting officers, and industry experts.

Agencies can visit conventions, trade shows, colleges/universities, specialty institutes, and private-sector companies.

Agencies can read the *Commerce Business Daily* (CBD), newspaper business sections, trade publications, and Internet home pages.

Preparing to select contractors. The first step is to identify the requirement. The following questions must be answered to determine how the requirement can be met: What do you want to change? What are your desired outcomes? How much can you afford to pay? How soon must change occur?

Second, determine an appropriate solution. The following questions must be answered to determine what the solution should look like before procurement: Is training the solution? If so, is a custom or off-the-shelf course indicated? Will training be delivered once or multiple times? What kind of training (computer-based training, etc.) is appropriate? Is the content volatile? What technical/design specifications apply?

Third, define the “perfect” contractor. Set standards up front prior to considering specific contractors; standards should be based on required knowledge and skills, relevant resources, past experience and track records, geographic location, and financial stability.

Fourth, estimate solution costs. Focus on all costs involved and think about the solution life-cycle: design and development costs, delivery costs, maintenance/update costs, license fees, and GFE/GFM/GFL.

Fifth, do other smart things: consult a contracting officer, incorporate multiple perspectives, review similar initiatives, list risk areas, change plans as appropriate, and stay engaged.

Developing a detailed Statement of Work (SOW). Procuring products and/or services from a contractor requires defining specific work requirements and developing a detailed SOW. A detailed SOW must include a background description of the requirement, problem definition, solution requirements, the period of performance, special requirements, a cost estimate, and terms and conditions.

Selecting contractors. Determine the extent of competition: sources sought, set-asides, 8(a) procurements, open competition, or sole source.

Formulating contractor selection criteria. To select the “perfect” contractor, the selection criteria are vital. Contractors must show clear knowledge of the (1) technical aspects, which include an understanding of the requirement, clarity and accuracy of the proposed solution, approach and methods, key personnel, and the subcontracting plan; (2) past performance and relevant experience; and (3) cost.

Understanding the Government requirement. Contractors must understand what is needed by an agency. To do so, the contractors must identify and understand the requirement; research the agency; determine who to talk to; identify documents to read; and determine preferred solutions, costs, and schedules.

Becoming competitive. To be competitive, contractors must be sure that they can fulfill the requirement. The contractors must bid the right people, select the right technical approach, propose a fair price, construct a realistic schedule, commit to quality, develop a sound management plan, analyze risks, and focus on a partnership with the Government.

Becoming the winner. Winning is only the beginning; this is when the real work starts. To be a winning contractor, the contractor must provide the best possible solution at a reasonable price.

Discussion

- What are the costs of the different types of training?

Costs differ based on the specific training requirement. Costs include labor, technical, and creative development. Locate cost and technical data (contracts reflecting similar training requirements) within one's agency or in other agencies to obtain an understanding of costs. Contact the Office of Personnel Management (OPM), Training Management Assistance (TMA) for assistance.

- How does OPM, TMA work? Can OPM, TMA help agencies choose a contractor?
OPM, TMA is an umbrella agency supporting other Federal Government agencies through interagency agreements. OPM, TMA selects contractors through a competitive bidding process every 5 years. Government agencies can contact TMA when they are in need of a contractor. Pulling from its base of qualified contractors, TMA can select a contractor to support specific training requirements within 24 hours through a competitive oral presentation process.
- What role does past performance play in selecting a contractor?
Verification of past performance is becoming vital in identifying "qualified" contractors. Ways to determine a contractor's past performance are to (1) review surveys compiled by your agency and other agencies, (2) request contractors to provide samples of previous projects, and (3) request contractors' references and contact these references. More and more agencies are issuing solicitations requiring detailed information verifying stability (e.g., financial, personnel, etc.).

Multimedia-Based Education, Training, and Performance Support—Tools, Trends, and Applications

Presenters:

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Will Peratino, Director, Distance Learning Programs, Defense Acquisition University

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Session Overview

Government education and training specialists have access to a rapidly expanding world of tools from which to choose to support their education and training needs. From CD-ROM, to virtual reality, to interactive television, it is easy for an educator to feel overwhelmed by the options available. With so many choices available, many training specialists are left asking the following questions: What technology best fits my needs? What fits my budget? What works? This presentation attempted to reduce that confusion and help attendees realize that *they* are in control of the technology.

Attendees were left with two basic premises:

- Regardless of the delivery media, effective training or Electronic Performance Support Systems (EPSS) will still depend on good design and not on advanced technology.
- No delivery method/media is ideal for all requirements—the challenge is to select the right mix of methods and media.

To frame their discussion and underscore these premises, Messrs. Thackray and Peratino discussed multimedia technology in the following terms:

- Definition of terms—computer-based training (CBT) and interactive multimedia (IMM).
- CBT/IMM applications.
- CBT/IMM cost factors.
- CBT/IMM development team.
- Advantages of CBT/IMM versus classroom instruction.
- CBT/IMM return on investment case studies.
- Electronic performance support systems (EPSS).
- Cost factors.
- Future trends.
- Demonstrations.

Listed below are each of the points, followed by a brief description.

Computer-based training. CBT consists of the following elements:

- Text, drawings, stills.
- Two-dimensional and three-dimensional graphics and animations.
- Student-controlled interaction.

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- Self-paced training, tailored to student needs.
 - Response judging and branching.
 - Automated scoring/record keeping.
 - Stand-alone or networked platforms.
 - Floppy disk/hard drive storage.

Interactive multimedia. IMM has the same features as CBT, plus the following:

- Extensive audio narration/descriptions.
- VHS-quality motion video.
- CD-ROM-based storage medium.
- Higher end graphics/animations.
- Advanced software for virtual reality, simulations, etc.

CBT/IMM applications. CBT/IMM technology may be applied to support virtually any training need. Applications include—

- Work simulation/virtual reality.
- Proficiency/mastery training.
- Refresher training.
- Job performance aids.
- Electronic reference tools and manuals.

CBT/IMM cost factors. Cost factors should be considered in the context of immediate and long-term needs, as well as utility/transferability of information from today's media to the technology of tomorrow. Factors include—

- New development versus conversion.
- Course length and complexity.
- Frequency, depth, and level of interaction.
- Need for high-quality graphics animation.
- Need for audio/motion video.
- Need for high-fidelity simulation.
- Economy of scale (larger quantities equal reduced cost).
- Location of instructors and trainees.
- Schedule/frequency of course offerings.
- Delivery platform costs/amortization.
- Delivery platform utilization levels.
- Network requirements/costs.

CBT/IMM development team. The effectiveness of any educational tool lies in the strength of its design. Almost always, strong design is the result of a team effort by individuals with individual talents. A well-balanced team consists of—

- Subject matter experts.
- Instructional developers.
- Interface designers (models and templates).
- Scriptwriters.
- Audio and video producers and editors.
- Computer graphic artists.

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- Computer programmers/software engineers.
 - Review/quality control staff.

Advantages of CBT/IMM versus classroom instruction. The benefits of training using interactive technology over typical classroom instruction are overwhelming. According to J.D. Fletcher (IDA, 1992), when compared to classroom instruction, CBT/IMM instruction yields the following:

- Learning gains are 56 percent greater.
- Consistency of learning is 50–60 percent better.
- Training time is 38–70 percent less.
- Learning rate/curve is 60 percent faster.
- Content retention is 25–50 percent higher.

CBT/IMM return on investment case studies. In 1995, Brandon Hall wrote in the *Multimedia Training* newsletter that companies across the nation are enjoying more fruitful training opportunities, thanks to the use of CBT/IMM technology. According to the newsletter, the following companies reported reduced training times:

- Storage Technology—60 percent less training time.
- Commonwealth Bank—50 percent less training time.
- Pacific Gas & Electric—50 percent cost savings.
- CSX Transportation—40 percent cost savings.
- Intel Logistics Systems—80 percent less training time.
- American Airlines—36 percent less training time.

Electronic Performance Support Systems. EPSS are tools designed to provide users with hands-on job enhancement training. As defined by PerformTech, an EPSS—

- Is an integrated electronic environment that combined training with on-the-job activities.
- Provides access to a full range of information including training, help, job aids, and resources.

EPSS characteristics. In an EPSS, all elements are based on job performance, and they provide tools that assist employees in performing their jobs with a minimum of support and intervention by others. Typical elements include—

- Expert or decision support systems that help solve problems.
- An interface by which the user and technology communicate.
- Information in the form of hypermedia-based data (text, audio, visual, knowledge bases, etc.).

Appropriate application of an EPSS. An EPSS is best applied to the following training scenarios:

- Workforce is computer-based.
- Populations are dispersed.
- Time constraints for training exist.
- Standardized performance is required.
- Job-related information and procedures must be distributed on an immediate and consistent basis.

Cost factors. Three important factors must be considered when weighing the cost benefits of developing an EPSS:

- Design/development time of CBT/IMM components.
- Conversion of text-based-resource material to online, hypertext resources.
- Design/development time for automated job aids, hypermedia databases, and search engines.
- Integration of all components in the EPSS.

Future trends/applications. When considering the future trends and applications of CBT/IMM, users are encouraged to keep in mind a big picture overview of the media continuum and to remember that this technology offers a range of options and trade-offs involved in each media selection. Also, users are reminded that no delivery method/media is ideal for all requirements—the challenge is to select the right mix of methods and media.

Future trends. Mr. Thackray based his projections about the future of the role of high technology in Government training arena on his 25 years in the training and education arenas. Mr. Thackray's predictions include the following:

- Internet/Web-based applications will become prevalent and very cost-effective.
- Hybrid delivery methods will be used to deal with bandwidth issues—e.g., mix of Web and mailed/networked video content.
- Digital video disc (DVD) technology will accelerate growth of multimedia applications.
- Many training and EPSS needs will be met by PC-based delivery—often networked.
- Regardless of the delivery media, effective training using the EPSS will still depend on good design and not on advanced technology.

Applications. Mr. Thackray demonstrated the educational uses of selected media for a variety of clients and training scenarios. Listed below are brief descriptions of technology and their applications:

- CBT for time and attendance training—proper completion of timesheet.
- IMM for management of chemical injuries—assessing and treating soldiers exposed to chemical weapons.
- IMM firefighter training/simulation—familiarizing fire/safety personnel with cargo plane layout.
- IMM HUD work simulation—helping a new employee work effectively in a new environment.
- Web-based math training for DAU—relearning math skills with the help of a Web site.
- Aircraft simulation/virtual reality—learning to recognize aircraft and national flags at high rates of speed.

Discussion

Effectiveness of PC-based training. One attendee questioned the effectiveness of PC-based training. The attendee cited a possible lack of familiarity with the PC among certain audiences. The presenters responded by citing that statistics show a huge rise in the use of computers with access to either CD-ROMs or networks. People are using computers, and they are increasingly comfortable with using a mouse. The advent of icon-driven, point-and-click technology has in part led to the demise of the popularity of touch-screen technology.

Determining the best environment. An attendee wanted to know the presenters' opinion of the technology and which technology they preferred using in training. The trainers reminded attendees that when selecting a media, trainers should keep in mind the goals of the training. For example, not every scenario calls for the presence of an instructor. In most cases of training, broadcast-quality video images are not required. More often than not, the essential part in most training scenarios is the student's interaction with the material.

Role of technology. One attendee asked if this technology would reduce the need for instructors. Presenters said that the ideal training scenario exhibits a balance of CBT/IMM and people getting together. Presenters were not suggesting that technology should carry the full weight of training.

Gaining access to training facilities. Presenters told persons interested in using area CBT/IMM facilities to contact one of several area facilities, including Anacostia High, the Pentagon, and Fairfax County Government offices.

How To Reach Federal, State, and Local Resources on the Internet

Presenter:

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Session Overview

This session explored how users can access information on the Internet. The Internet contains information resources for Federal, State, and local Governments, organizations, and agencies.

Audience participation. Audience participants introduced themselves, identified the Government agency that they worked for, and stated what they wanted to learn from the session. Participants represented various agencies and military installations such as the U.S. Environmental Protection Agency, Veterans Affairs, Maxwell Air Force Base, and U.S. Department of Education. Participants wanted to learn how the Internet could increase effectiveness of instructional learning functions, World Wide Web home page development, integration of training, etc.

Americans Communicating Electronically (ACE). ACE is made up of more than 5,000 volunteers (in 100 agencies and 20 countries) dedicated to the following vision: Public Electronic Access to Government Information by *all* citizens.

Mr. Tate is chairman of ACE. ACE meets the third Thursday of every month at the Small Business Administration. For more information about ACE, see its Web site at <http://www.sbaonline.sba.gov/ACE>.

The Internet: an electronic resource. The Internet (a worldwide system linking thousands of computer networks) creates a one-stop shop where customers can locate needed Government-related information. For example, if a user needed information related to the White House, the user could access the information through the World Wide Web (an interactive system that delivers Internet information with easy connections between computer systems and delivers information in an easy-to-read, multimedia format).

Once the user is in the White House Web site, he or she can move to another information source by clicking [a mouse] on a Hypertext link (an active link to other information sources). The Hypertext link is highlighted or colored text. Any Web site that allows the user to link to other sources of information is called a gateway. (The World Wide Web now contains more than 1,000 Government-related sites.)

To assist the user in locating Government-related information, ACE has published the second edition (1996) of the "U.S. Government Information—Internet and other Electronic Resources Guide." The Guide lists Government Web sites and their User Resource Locator (URL), an online address for a Web site. The Guide also provides instructions on how users can find what they are looking for.

Hundreds of ACE members have worked to digitize their agencies' online servers, helping to make the Government work better and cost less.

The Mid-Atlantic Eisenhower Consortium for Mathematics and Science Education Research for Better Schools has published a comic book to help educators and students understand the Internet. Mr. Tate recommends the book to *anyone* who wants to learn about the Internet.

USDA's use of Internet. Faced with many management challenges such as downsizing and redefining customers, USDA is developing distance-education strategies to improve customer service. For example, employing the Internet for training as opposed to using video has resulted in higher rates of learning.

Recommended Reading

Tate, T., and Long, G. "U.S. Government Information—Internet and Other Electronic Resources," 2nd Edition, 1996. URL: <http://www.sbaonline.sba.gov/ACE>.

The Mid-Atlantic Eisenhower Consortium for Mathematics and Science Education Research for Better Schools. "Presents Internet Jones," *An Educator's Guide To Travelling on the Information Superhighway*. 444 North 3rd Street, Philadelphia, PA 19123. Phone number: (215) 574-9300, Extension 280.

Distribution of Distance Learning ResourcesDistribution of Distance Learning Resources

(Downlinks,

(Downlinks, Videoconferencing Sites)

Videoconferencing Sites)

Presenter:

Maj. Rick Gividen, Army National Guard Distance Learning Officer, U.S. Army National Guard

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Session Overview

This session was designed to inform attendees about the thousands of Federal- and State-operated distance-learning facilities available for their use in training field staff. The Army National Guard (ANG) makes available at no cost a database of distance-learning resources—sites with classrooms equipped with satellite downlink and video teleconferencing equipment—at Federal- and State-owned Government facilities across the nation, from Army bases, to universities, to public health clinics, to community colleges. Maj. Gividen presented the history of the database as a way of illustrating the utility of distance-learning and the database.

Background. Traditionally, ANG offered training to its soldiers at its central training facilities in Little Rock, Ark. These facilities provided soldiers from all over the country with training sessions of 2 days to 3 weeks. As overall budget decreases reduced funds available for costs associated with training, such as travel, ANG expanded its distance-learning capabilities.

ANG needed to develop a new way of accomplishing its goal: getting training to its soldiers. To accomplish this goal, ANG asked two primary questions:

- How will ANG reach its dispersed audience?
- How will ANG increase the effectiveness of its training dollars?

Distance-learning fits ANG's training environment.

Media options. Maj. Gividen discussed the distance-training options and technology available to ANG's distance-learning program.

Options included the following:

- Live interactive instruction—instructors/students in classroom.
- Synchronous interactive instruction—online chatrooms.
- Audio computer conferencing—one-way video, two-way audio.

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- Video teleconferencing—two-way visual and audio.
 - Interactive television—video instruction that includes hand-held response pad.

Self-paced instruction:

- Print—use of onsite instructors with manuals, workbooks, etc.
- Video—broadcast of instructors/training sessions.
- Computer-based training (CBT)—using CD-ROM and other computer program-driven training models.

Interactive television pilot. In October 1993, ANG chose to develop an interactive television pilot project. The pilot training session would meet the following criteria:

- Take place within 6 months.
- Be of short duration (2–4 hours).
- Provide training that was in demand.
- Be available at most sites for the least cost.
- Use the most widely available media capabilities.

It is important to note that ANG was not testing the effectiveness of distance-learning; that had been proven prior to 1993. Rather, this pilot was the first step toward ANG's use of the technology. The pilot was the beginning of a change in ANG's business processes.

In December 1993, ANG had the pilot in place. In March 1994, ANG presented a 4-hour interactive television session on retention awareness training. Letters were sent to ANG training officers across the nation, informing them that training would be available at the specific date and time, and providing them the satellite band-width information. Training officers were urged to locate and arrange use of facilities in their area. As a result, 2,432 soldiers joined the training at 94 sites (U.S. Department of Defense (DOD), Federal, and academic) in 32 sites. Cost of presenting the training consisted of rental of satellite uplink and broadcast time, and distribution of master print materials to field personnel in each State. From the instructor's perspective, ANG's average cost of training was \$6.82 per soldier.

Government Education and Training Networks (GETN) Database Version 1.0 (Beta). The following information was provided in a factsheet distributed by Maj. Gividen.

- *The GETN Database.* The GETN Database provides information on the location of Federal and State distance-learning facilities. It contains the addresses, telephone/fax numbers, type of distance-learning facility, and points of contact for these sites. Version 2.0 of this database will include additional information such as number of classrooms, seating capacity, and usage fees if applicable. Options to provide online access to the database are being explored.
- *Contributing Agencies:*

Army National Guard	Social Security Administration
Centers for Disease Control and Prevention	U.S. Air Force
U.S. Department of Energy	U.S. Air National Guard
U.S. Department of Labor	U.S. Postal Service
U.S. Environmental Protection Agency	U.S. Army TRADOC Satellite Education Network

Federal Aviation Administration
Internal Revenue Service

Veterans Benefits Administration

- *Software needed to view the database.* The database was created on Microsoft Access. Users need a PC with Microsoft Access Version 2.0 or higher. If extensive geographical analysis is desired, users are recommended to use a software mapping application such as MapInfo.

Mapping software helps users physically locate nearby training facilities. It takes databases and converts zip codes to longitude and latitude demarcations and pinpoints locations. Different icons represent different agencies (green triangles are Army National Guard sites, blue planes denote Air Force sites, etc.) Mapping software offers radius clustering capabilities so that users can locate the nearest facilities. ANG suggests locating facilities within a 1-hour drive of the audience-base.

- *Utility of database in distance-learning efforts.* The database can provide users with potential sites for delivering training. This information can be especially helpful to agencies with a limited number of distance-learning facilities. Users must coordinate directly with host agencies to determine availability, costs, and related logistics.
- *Obtaining a copy of the database.* ANG created the database as part of its distance-learning initiative. The database grew through the cooperative efforts of Federal agencies involved in the Government Alliance for Training and Education. If an interested party does not have information currently available, a letter is sent on letterhead, outlining what information will be sent when it is available.

To order copies of the GETN Database, contact—

Maj. Rick Gividen

Army National Guard Distance Learning Officer

NGB-ARO-TS

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ANG provides a copy to each agency that contributes site information to the database. Site information must be provided on diskette in database or spreadsheet format. Include the following fields or columns:

Agency

Facility name

Address

City, State, Zip

POC

Commercial phone, DSN phone

Commercial fax, DSN fax

Video technology

TRIDOM site number

Discussion

Note: Maj. Gividen's presentation was very informal, and he encouraged attendees to interject with questions or comments. Most questions and comments were incorporated in the information above.

Selecting appropriate technology. An attendee asked which type of distance-learning technology was best. Maj. Gividen and others answered by reminding the attendee that each technology has its advantages and applications. The most appropriate technology depends on the training task at hand. When determining the use of a technology, trainers should (1) assess their needs first and (2) determine

what their capabilities are in terms of access to technology. Maj. Gividen underscored the premise that when it comes to technology, “Just because you *can* use it, doesn’t mean you *should* do it.”

Cost of commercial versus DOD satellites. An attendee asked if use of DoD satellites were more cost-effective than commercial satellites. In terms of availability and overall cost-effectiveness, ANG recommended use of commercial satellites. Costs associated with satellite broadcasts consists of an uplink fee and leasing of satellite time. ANG estimates an average cost of \$120 to \$250 per hour for satellite rental time. Other costs include printing and distributing master print materials to States for reproduction and distribution to soldiers.

Locating training facilities. An attendee asked how one locates the nearest training facility. ANG replied by saying that the steps are to (1) locate the audience, (2) locate facilities, and (3) determine the availability and costs of nearby facilities. ANG knows it has 3,000 armories nationwide and uses the GETN Database to cross-reference facilities with armories and locate the closest facilities.

Site facilitators. An attendee asked if onsite facilitators were formally trained in the use of interactive television media. ANG does not use formally trained site facilitators. In preparation for the training, ANG distributes materials for a “paper training” in case of a technological breakdown. These are referred to as “hip-pocket trainings.” In 25–30 distance-learning events since 1993, ANG experienced only one breakdown, where transmission was lost for 10 minutes.

Effectiveness of training. An attendee asked how instructors are selected for this media and how effective it is. In most cases, instructors have one-way video and two-way audio. This means he or she will be speaking to a television camera and will be able to ask and field questions from abroad. This typical absence of students in the classroom requires an adjustment in teaching style for most instructors. ANG recommends setting up a screen-test for potential instructors. Many adapt their presentation with practice.

ANG’s research shows that people always prefer a live situation, but that distance yields the best scores. There is an inverse relationship between preference and effectiveness. ANG’s research shows that students and instructors say they prefer the following: (1) resident training, (2) interactive training, and (3) audiographics training (one-way television, two-way sound). Measured retention scores suggest, however, that distance learners outperform in-residence students. Performance scores show the following levels of effectiveness: (1) audiographics, (2) interactive, and (3) resident.

CD-ROM Learning System for Community-Based Skills

This session provides a demonstration of a computer-based simulation designed to train personnel to effectively conduct public meetings to support public environmental education and community involvement efforts.

Presenters:

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Session Overview

EPA is working to enhance its image as a facilitator and resource to local communities and to build public support and cooperation for EPA programs and goals. To this end, field staff are being asked to take on a more active community partnership role. The EPA Institute discovered that many employees did not know how to work best in public forums even though they are often asked to participate in these meetings.

EPA training officers felt that the work of Dr. Roger Schank at the Institute for the Learning Sciences, Northwestern University, offered some solutions. Dr. Schank has developed a multimedia learning system that incorporates six learning architectures:

- Simulation, or learning by doing.
- Incidental learning.
- Reflection, or analysis, and personal thinking.
- Case-based, using experts as repositories of learning, storytelling.
- Exploring, or just-in-time learning.
- Goal-directed—being able to fail in a safe, learner-controlled environment.

Because this approach was in line with their learning design needs, the EPA Institute awarded a grant to NWU to develop a prototype computer-based multimedia learning system. The product of that effort is the Community Relations Simulation (CERES).

Although still only in the prototype stage, CERES will eventually offer four scenarios for staffers, two of which will concentrate on urban environmental concerns and two focusing on community interaction issues surrounding natural resources.

The demo program presents real-life situations and then offers options for action or response. Before taking an action, the learner can explore the pros and cons of that action and learn about some of EPA's past experiences with similar situations. Simulations of subsequent responses from members of the public are determined by the choices made by the learner.

Additionally, the student is given the chance to hear “war stories,” interviews with EPA field staff who have faced similar situations and how they handled them. The program also offers feedback to the learner in the form of news releases, press clippings, and opinion polls based on the specific choices the learner has made.

Discussion

During the discussion, it was pointed out that the program offers community or customer feedback opportunities, but that plans to incorporate supervisory feedback were not apparent. The choices offered will be based on EPA policy and guidance.

The CERES prototype is CD-ROM-based and has been developed at a cost of \$200,000.

The intended audience for this program is primarily EPA scientists and technical field staff who are ill-prepared to deal with community-based situations. It will also be available to other Federal, State, and local environmental partners faced with building similar capabilities within their ranks.

The presenters requested responses and feedback from the audience. Comments made by the participants included the following:

- “Best feedback system on community relations I’ve seen.”
- For people who haven’t had to think this way, this is good baseline information.
- Teaches the importance of handling phone calls. Lots of advantages to this approach.
- In the simulation, the EPA staff person is shown as more of an expert rather than a facilitator. The program needs to show more interaction between different members of the public. (The presenters agreed strongly with this comment.)
- A suggestion was made that the simulation be able to handle different “roles” for the presenter (e.g., as science authority, as facilitator, as regulator, etc.).

Electronic Training Mall/Government Video Resources

Presenters:

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Session Overview

Mr. Ziener welcomed the group and gave a brief overview of what the day's discussion would entail. The National Technical Information Service (NTIS) and FedWorld were represented, and the group heard presentations about the Defense Instructional Technology Information System (DITIS) and the Defense Automated Visual Information System (DAVIS).

Mr. Ziener introduced the concept of sharing resources among the Federal training community elements. He focused on the overall policy of delivering services to meet needs as established by the training community. With the phaseout of the Office of Personnel Management's involvement in the direct delivery of training and the increasing need for economies in the delivery of Federal training services, the Human Resource Development Council established a number of working groups. Early on, it became evident that there was no central place to begin accessing training information, resources, products, and services. This prompted development of the concept of the Federal Training Mall, which provides the necessary central location for Federal training information, resources, and services. FedWorld and the National Audiovisual Center are the lead elements within NTIS implementing this concept.

The role of NTIS is to serve as a conduit for Federal technical information to the public to increase the use of available resources. The Federal Training Mall, as an operating unit of NTIS, focuses on the training community, its services, its needs, and its collaboration within the Federal, State, and local community.

The pilot of the Federal Training Mall can be accessed via the Internet at <http://www.FedWorld.gov/training>. The Training Mall contains two anchor stores: Federal Jobs Listings and Gateways to other Federal training Web sites. The Federal Jobs Listings store contains

information maintained by Atlanta's Office of Personnel Management. It also contains a powerful search engine that allows one to narrow the search considerably. A great deal of traffic is generated through the Federal Jobs Listings. Two-thirds of the users stop in the Federal Jobs store. This page contains pointers that provide quick access to various other Federal agencies.

The Mall also has a number of specialty stores with material on training, information, resources, and products. In addition, the Training Mall provides electronic ordering and pickup information. For example, through a recent agreement with Kinko's, customers may place their orders for products online and pick up a hardcopy at Kinko's. Customers may also purchase training products online with credit cards.

Other stores will include a list of Federal production facilities and Government contractors (qualified media producers) with points of contact. Another source of training materials that has never been tapped is the grant program.

Other specialty stores will provide training delivery services including—

- A schedule of federally delivered training searchable across Federal agencies and vertical connection to Federal training information from other agency Web pages.
- Electronic registration for Federal courses. The Mall offers centralized registration and the opportunity to pay via credit card or deposit account with NTIS.
- Centralized registrar function providing annotated transcripts for all courses registered for electronically. This service is valuable to the Federal community because it offers a single access point for obtaining annotated transcripts.

Mr. Melton reported that the Web site, which now looks like an organizational chart, will soon be taking on a new look as a graphic artist makes it more visually appealing by adding more high-end graphics.

Two sources operating funds include the end-user and the agency. In the first scenario, the end-user, who has full access to the mall, pays for training materials, registration, and transcripts. Agencies will pay for things such as maintaining the schedule. They will also pay depending upon the level of electronic registration services requested. In the example of GSA, costs will be absorbed into the cost of the course. Private-sector participants will pay more, on the average, than what the Federal Government pays.

By having this central source for registration services, agencies will have the immediate ability to handle the transfer of funds, a central marketing source, and the ability to farm out many training services that are increasingly difficult to do internally. Use of a central source is very cost-effective.

Mr. Melton presented a brief background of FedWorld. FedWorld began 3½ years ago as a pilot project of NTIS. It initially started as a feasibility study with the help of Congress to study online information dissemination. NTIS volunteered to do that study to get a good idea of what services online users wanted. Eventually, an online BBS system called FedWorld was created. FedWorld is a joint effort between NTIS, FedWorld, and the National Audiovisual Center.

He then explained the layout of the pilot Mall site and showed the group how to conduct job searches

on the Federal Jobs Listings. Mr. Melton demonstrated the different types of searches using position title, relevancy ranking, specific states, alphabetical listings, and number of job hits to view. The search produces a list of jobs, on which the user may click to receive further information.

Ms. Fitzgibbons of the Defense Manpower Data Center (DMDC) gave a presentation of the DITIS system. This system consists of a catalog of interactive courseware (ICW) funded by DOD. DITIS resides at the Defense Manpower Data Center and is an ORACLE database. Types of ICW programs in DITIS include, but are not limited to, courses related to engineering, medicine, and general education. DITIS provides a central source of product information to the ICW community, aids in the decision-making process, and decreases spending by encouraging resource sharing.

DODI 1322.20 lays the guidelines for using DITIS. DITIS use requires a minimum of three stages: (1) query database to determine if anything currently exists that will fulfill the user's data requirements; (2) register the user's intent in the database in the form of a proposed development record; (3) update the database throughout the life cycle of the ICW development.

The user may interact with the database in two ways: (1) manually—fill out DD form 2568 or (2) query and input data into the database via a Windows software application.

Minimum system requirements are Windows Version 3.1 or later, high-speed modem or direct Internet access, 386 with 4 MB, and floppy disk drive. Modem users may connect through the toll-free dial-in number. Ms. Fitzgibbons can provide further information by contacting her at the DOD Center at (408) 583-2400, ext. 4082.

The DITIS Web page can be accessed through <http://dubhe.cc.nps.navy.mil/~ditis/>. After the online application is filled out and submitted electronically, the application information is transmitted electronically to DMDC, and the user receives confirmation of the URL in order to download the software via the Web. This process cuts down on administrative time and expenses related to duplicating the software for DMDC and also decreases the waiting time for the user.

A new version of DITIS Version 2.0 is scheduled to be released late this summer. In the meantime, DMDC will further explore the use of the World Wide Web and will continue to coordinate with the ICW community to encourage DITIS expansion in terms of knowledge base and the number of organizations that are utilizing the service.

OTT SPIDER or the Office of Training Technology, Seamless Product Information Data Exchange Repository was established by Chief Naval Operations as another good source of training and technology information.

Mr. Straub presented the DAVIS or the Defense Automated Visual Information System. DAVIS is 20 years old and deals primarily with traditional audiovisual materials. The database contains audiovisual data defined by DOD as motion media with sound developed according to a script. Direct access to DAVIS may be gained via modem or telnet. Electronic access will be available through the World Wide Web on a date targeted for the end of the fiscal year. Government agencies will be able to query active items listed in DAVIS via the Web. Information on more than 19,000 audiovisual productions will be available.

Productions have included such general use topics such as Lyme Disease and Hurricane Hugo. Two Navy hospitals were hit by Hurricane Hugo and created videos about lessons learned. These types of productions can be used widely outside DOD.

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Discussion

One participant raised the following issue about Mr. Melton's presentation: If the customer was interested in all computer specialist positions in the northeastern United States, for example, could he or she receive specific updates electronically, rather than searching the job bank every time the listings were updated?

Mr. Melton answered that this process, known as profiling, is available on some Web sites, whereby the customer registers to receive such listings. He then made note of the comment and said that it was an excellent idea.

Building the Capacity Within Your AgencyBuilding the Capacity Within Your Agency

Presenter:

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Session Overview

This session described where participants can get information for building agency capabilities through the sharing of resources and experiences. Jackie Hess said that over the past decade, she has observed that agencies try to integrate technology into their training organizations and has noticed certain patterns emerging. She asked attendees to identify some of their interests. The responses included the following:

- An attendee representing a joint venture between George Mason University and the Air Force asked how to get teamed and tuned into the “Federal vocabulary of interactivity.”
- A participant mentioned the National Technical University, a consortium of 40 universities whose curricula are linked through satellite. Students registered at one university can take classes toward a degree at another. There is a fee structure for joining. Some of the participating universities include the California Institute of Technology, the University of Michigan, and the Massachusetts Institute of Technology.
- A representative of the Centers for Disease Control and Prevention (CDC) Public Health Training Network remarked that his organization’s internal resources have been fully utilized and that they need to enhance their ability to fully access the rest of CDC’s resources.
- A representative of the U.S. Navy from Charleston Naval Base said that they had set up a partnership with Clemson University in an electrical engineering graduate program. Georgia Tech is another university that has considerable experience in fostering such partnerships.

History of partnership. The linking of academia and Government began in earnest in the early 1970s. In 1972, the Government provided impetus to facilitate cooperation between academia, corporations, and the Government itself by seeding partnerships with significant funding, much of which came through the National Science Foundation. Partnerships were set up. The successful partnerships of that era evolved into today’s research parks. In the early 1980s, some analyses were funded to determine what worked and what did not with these nascent partnerships. The “common sense errors” that had led to the unsuccessful marriages among the academic, commercial, and public sectors include the following:

- Partners made unrealistic claims about what they could offer the other sectors.
- Overall goals and agendas as well as the expectations of the different partners were not clearly articulated.
- The sectors spoke in different languages, and there was not yet a cadre of people well versed in the disparate vocabularies of different sectors.

At that time, the successful partnerships focused on basic, not applied, research.

Current status of partnerships. Some universities now act in a more entrepreneurial fashion than

others, creating a corporate culture within academia without compromising their standards. These universities include George Mason, Rice, Harvard, Georgia Tech, Virginia Tech, and Stanford. Most important, these schools have created a climate in which an entrepreneurial professor can operate. The individual professor is the key point of contact; Charlie White at the George Mason multimedia center is an example. Ms. Hess offered to send to interested participants a list of centers at universities looking to do business with the Government. A participant added that the dean of the graduate school of electrical engineering at Clemson University is very enthusiastic about creating this kind of partnership. He added that problems occur at the level of individual professors who do not want to change their paradigm, and he advised participants to search out schools with track records of encouraging partnerships.

Keys to success. Ms. Hess reviewed some of the concepts common to agencies that have successfully built capacity. A recent in-depth cost-effectiveness study helped the U.S. Information Agency (USIA) perform strategic planning to acculturate themselves into new training functions. Convincing management to make significant capital investments means focusing on the bottom line; therefore, there is a need for more quantitative studies. Currently, in the field of information technologies, there are 9.5 qualitative studies to every one-half of a quantitative or cost-effectiveness study. There is nothing like hard numbers, and cost-effectiveness studies can provide those. Happily, quantitative studies have always provided numbers supportive of information technologies. The seminal study in this area was done for the Institute for Defense Analysis by Dexter Fletcher.

The NDL's study performed for USIA covered numerous variables, reflective of how rigorous the study was. All the numbers provided were researched and generated by the National Demonstration Laboratory (NDL), and they seem to be valid. The numbers are also conservative; when doing quantitative analysis of the cost effectiveness of technologies, it is wise to use conservative estimates. This also implies not quantifying factors that could have been quantified, so as to make it clear that the study is indeed conservative. Even making conservative assumptions, a study still generally shows that technology is 23–26 percent more cost effective than classroom training.

How to build capacity. There are several factors, including the following:

- *Develop a common vocabulary.* This problem is often encountered with learning technologies. People may not know the language and may be intimidated by the acronyms. One of the first things to do, therefore, is to capture people's attention in an understandable and nonthreatening fashion. This involves developing a commonly understood language based on the administrative capabilities of the audience, and not on their technical knowledge. Technical "razzle-dazzle" is generally counterproductive.
- *Reduce resistance to the concept.* There is always some organizational resistance to change. An example is the resistance encountered in switching from a DOS-based to a Windows-based computer operation. To erode this resistance, it helps to capture the support of management: "bubbling up" is not as effective as "top down." At NDL, the pattern observed has been to get two or three key individuals at an agency converted who subsequently influence the organization at large. These people are usually not top management, but they are in a position to influence management. There is a danger of capturing these key individuals too quickly, which can lead to management disenchantment and even greater resistance to change. Distance-learning is an example. In the first era of distance learning, the technology got a bad reputation, partially because of a disconnect between the hope (or hype) attached to it and the initial actuality of it. The State of Georgia's educational department had invested heavily in

distance learning, but had disappointing results. Distance learning is in a second era now, and many problems have been overcome. In addition, strides have been made in interactivity—as with the Internet—which can be married to, and subsequently enhance, distance-learning technologies.

Residential classroom model. From the NDL lab, four models on specific course-delivery methods were generated. This model is based on a standard, static teaching method, the opposite of distance learning, which makes little use of technology and has students travel to a central site. The assumptions about travel and per diem are all included in this model.

Computer-based instruction/multimedia model. This model is site-based as well. However, this model makes greater use of technology, specifically CD-ROM development and use of computer-based ports. To invest in this model incurs significant upfront development costs, but it does represent a savings over the residential classroom model as manifested in reduced costs in travel, salaries, and instruction.

Interactive video teletraining model. This model involves distance learning—one-way video and two-way audio—and represents savings over residential classroom in every area except communication and hardware/support. The assumptions here were that hardware would have to be purchased.

Videoteleconferencing model. This model involves two-way video and two-way audio, like CUED and other software. This method is still expensive. NDL was surprised how similar the savings of interactive video teletraining and this method were.

Source of cost savings. There is a difference between a cost-benefit analysis (CBA) and a cost-effectiveness analysis. A CBA has to quantify benefits, which vary as much as costs vary, and can include such factors as productivity and morale. This is not the case with a cost-effectiveness study, which does not attempt to quantify benefits. The significant savings found in NDL's cost-effectiveness study were in salaries and travel costs. The savings in salary costs came from several sources: (1) the assumption based upon research that course time would be cut by a certain percentage and that people, as they would be learning faster, would need to spend less time with the course, representing an opportunity-cost savings in those individuals' salaries; (2) the corresponding need for less instructor time; and (3) utilization patterns tying the training with travel to the course site.

These comparisons assume a fixed audience, whereas distance-learning technologies often incur very expanded audiences. To make this comparison valid, a minimum number of courses and percentage of courses are suitable for distance-learning. However, the study did not write in savings for mass purchases and did not make serendipitous assumptions regarding the Agency's ability to use satellite time.

This analysis was effective in getting management buy-in because the study was quantified and was based on empirical research. The most difficult part of the study for the Agency was in aggregating and producing the data. The Agency had provided NDL a great deal of raw material. In the end, the manager who wants to get the study should realize the value of getting the data. This is all part of building capacity.

Reasons to use contractors to build capacity. Not only are contractors knowledgeable; they can also

afford to say things that an organizational person may not be in the position to say. Contractors do not speak from an organizational perspective, and this allows them to speak their mind with greater alacrity.

What is capacity? It should be defined broadly. The definition of expanding capacity changes depending on what kind of capacity is talked about. Some outputs are easily measurable. In defining capacity to build more of it, it is wise to identify what is quantifiable and what is more subjective (such as morale). Some measures, like employee turnover, would be somewhere in the middle. Strategic planning cannot be done without thinking about the nature of the organization and knowing certain things about it. There is also external capacity; cost recovery is an element of this, as are partnerships. Outreach can be quantified. An agency that thinks in terms of what it owns that it could sell as an agency is engaging in capacity building. Sharing information is difficult to do, but creating systems to facilitate this sharing is an essential element of capacity building, and is in fact an art form.

Discussion

The following is a summary of some discussion after this presentation:

- Considering “distance learning” synonymous with “training” may or may not be a plus in selling the methodology. In some organizations, the ability of the administration to communicate is an important aspect to nourishing the willingness to fund a distance-learning studio.
- Distance training can also be used for distance educating. In selling distance learning internally within an organization, sales should not be written into the cost-effectiveness study. Use your own data, and use conservative estimates.
- A satellite system might allow for polling of an entire organization, but there are concerns with this as well.
- Breaking training out of the human resources management module can be very beneficial. Although they often analyze training, personnel departments often do not emphasize learning, and training programs sometimes devolve into a numbers game, which undermines the impact of training as a whole.

Evaluating Learning Events in Order To Make Sound Decisions

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Session Overview

This session explored the evaluation process and how this process can help training planners and managers to invest in training that produces measurable, important results.

Training. As used here, training means a structured learning activity or process. To determine if training is needed, a needs assessment or performance analysis must be done. This process requires analysis of the individual's—

- Experience level.
- Skills and knowledge base.
- Motivation.
- Culture (personal versus work environment).
- Beliefs and values (personal versus work environment).

In addition, the individual's work environment must be examined:

- Tasks (complexity, importance, frequency).
- Standards (too high, too low).
- Information, tools, and equipment (appropriate to accomplish tasks).
- Feedback (communication to the individual).
- Reward (sufficient to motivate).

If training is required to improve or change performance, how should the learning experience be designed (e.g., in the classroom versus distance learning)? Who is the target audience, what methods and tools are needed, and what support is required when the individual uses what was learned on the job?

Evaluation. Evaluation is a systematic way to measure learning activities and the results of those activities. Traditionally, a training evaluation plan is developed after the learning activity has been designed. Planning for evaluation usually involves course developers who have a keen interest in validating the instructional design decisions made during the training development phase, and subject matter experts (SMES) (those who know the work) who desire feedback about training product accuracy, completeness, clarity. Evaluation activities are usually limited to learner's opinions of instructor adequacy, the training environment, methods, and technology. Unfortunately, such surveys generate a database that is generally inadequate for the larger decision-making process, a process that raises questions regarding the efficiency and effectiveness of the learning process.

Recognizing the limitations of the conventional evaluation paradigm, a new approach to enhance the value of training evaluations is to (1) include key stakeholders in the evaluation process, and (2) make evaluation an integral part of the planning, design, and delivery stages of learning activities.

Stakeholders. Stakeholders are those groups having an important interest in the training event or the results of training. Stakeholders may include managers (line, upper level), administrators, clients, labor unions, and constituents. The stakeholders for training do not remain constant, but change depending on the goals of the training and other issues such as cost-effectiveness, efficiency, and organizational priorities. By identifying and meeting stakeholders' needs, a significant opportunity is created to refine the training. Integration of the evaluation process throughout the planning, design, and delivery stages, and inclusion of input from a variety of stakeholders, produces more efficient and effective training.

Steps in Evaluating Learning

- *Step 1: Identify stakeholders.*
 - Identify everyone who might have an interest.
 - Determine which stakeholders have *key* interest.
 - Include those who may be affected by the outcome.
 - Stakeholders may change with each learning design project.
- *Step 2: Determine outcomes that are important to stakeholders.*
 - What would convince the stakeholder that the training is good?
 - What kind of evidence would justify the stakeholder's investment?
 - In a year's time, what would the stakeholder like to see as a direct result of this program?
- *Step 3: Design an evaluation.*
 - Structure the evaluation to derive data relevant to stakeholder's questions.
 - Include important outcomes and critical elements.
 - Pilot test instruments. (Check pilot results with stakeholder.)
- *Step 4: Collect, analyze, and interpret data.*
- *Step 5: Provide feedback to stakeholders.*
 - In a form meaningful to each stakeholder, provide feedback that speaks to the particular interest of the stakeholder in terms of quantitative and qualitative data (precision and clarity).

Stakeholder involvement in the evaluation process can generate data and information needed by all stakeholder groups to ensure that specific kinds of information needed to make decisions about the desired outcomes of a particular learning activity are obtained. The following example demonstrates various levels of stakeholder involvement and desired outcome:

A Training Course for Performing a Lab Test

Learners: Acquire skills in performing a lab test; certification.

Safety Managers: Assure the safe practice of lab test.

Line Managers: Effectiveness of training; lab standards.

Employee Unions: Worker safety.

Budget Managers: Efficiency; cost; equipment required.

High-level Program Administrators: Cost of distance-based learning versus classroom training; quality of training; contribution to the “bottom line.”

Lab Certification Organizations: Standard methods and safe practices.

Agency: Policy issues such as confidentiality of results; accessibility of learning activity to all target audiences.

Patients/Public: Accurate tests; timely results.

Animals Rights Activists: Humane treatment of lab animals.

Audience Participation

Session participants were divided into small groups to participate in two exercises. The first exercise was used to demonstrate the process for *Identifying Stakeholders in Evaluation of Training*.

Participants were asked to use a hypothetical situation to (1) identify potential stakeholders in an evaluation of training, (2) determine possible unintended consequences of training, and (3) decide which stakeholders should be involved in the evaluation of this training intervention.

The second exercise was used to demonstrate the process of *Stakeholder Analysis* once the stakeholders have been identified. In Part I of the analysis, participants were asked to look at a specific stakeholder's interest based upon the conclusions from the first exercise to determine the following:

- (1) What specific outcomes would convince the stakeholder that the project was worth doing?
- (2) What data/information would suggest that these outcomes occurred?
- (3) What form will make the data most useful (quantitative data or qualitative data, a mix of narrative description and numerical results)?
- (4) How detailed do the results need to be?
- (5) Whose reactions, opinions, or observations will have the most credibility with this stakeholder?

Part II of the second exercise was designed to determine the following: (1) What data should be collected to determine the needs of each stakeholder? (2) How will the data be collected? (3) Who will analyze/interpret the data? (4) In what form will the information be communicated to the stakeholder?

Session Conclusions

- Learning activities are investments.
- Evaluation cannot only lead to improvements in training design, but also indicate the impact of learning on job performance and show the return on investment to the organization.
- With those who have a stake in evaluation results included in the evaluation design, the evaluation effort is focused on producing information relevant to key organizational decisions.

Recommended Reading

Mager, R. "Analyzing Performance Problems" or "You Really Oughta Wanna" (with Peter Pipe), The Mager Library. Center for Effective Performance, Inc., 4250 Perimeter Park South, Suite 131, Atlanta, Georgia 30341. \$17.95.

"Participant Action Plan Approach (PAPA)," *Assessing Changes in Job Behavior Due to Training: A Guide to the Participant Action Plan Approach*. Developed by the U.S. Office of Personnel Management. National Technical Information Service (NTIS). U.S. Department of Commerce, 5285 Port Royal Road, Springfield, VA 22161. Telephone ordering: (703) 487-4650. Use Accession No. PB84-105238.

Lincoln, R., and Dunet, D. "Training Efficiency and Effectiveness Model (TEEM)." Center for Disease Control and Prevention (CDC), Division of Media and Training Services (G21), 1600 Clifton Road, Atlanta, GA 30333.

"Training Evaluation: A Planning Guide," Office of the Assistant Secretary for Personnel Administration, U.S. Department of Health and Human Services, December 1988.

>From Videodisc to CD-ROM—Conversion Processes and Digital Video Technology

Presenters:

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Session Overview

As new digital technology emerges, Government education and training specialists will need to face the challenge of converting or reengineering existing programs and tools from their current media into newer, more streamlined ones. Several options are emerging, and making the correct choices will save people time and money. Mr. Thackray and Mr. Peratino designed this session to help attendees better understand the conversion options available to them, and to help provide answers to some of the more basic questions about conversion processes. The presenters' discussion covered the following nine primary points:

1. Software-assisted digital video education and training advantages. The videodisc is dying off, and in its place CD-ROM-based software-assisted digital technology is emerging. This technology brings users another step closer to a plug-and-play environment. Specifically, this technology—
 - Allows for true cross-platform compatibility (PC or MAC).
 - Makes interactive courseware (ICW) training materials more portable in digital format.
 - Requires no extra hardware.
 - Offers access to expanding inventory of COTS education and training materials.
 - Provides compatibility with evolving information infrastructure.
2. ICW conversion/reengineering. Courseware conversion/reengineering frees restrictions imposed by differences in platforms and formatting. Advantages include the following:
 - Conforms conversion/reengineering to CD-ROM all digital, Windows-based formats.
 - Extends life of valid courseware.
 - Provides huge expansion of potential training platforms/audiences.
 - Protects the Government's investment at fraction of original development cost.
3. Courseware conversion factors. Courseware conversion is most logical when the user has access to the courseware's source code, documentation for original authoring system, access to sources for graphics, and when the source code is compatible with the target authoring system. Also, attendees should review their contracts to ensure that master copies of any courseware developed are in fact the agency's property. Contractually, these masters should be identified as "source" items to ensure ownership and also as "executable items" so the agency may

duplicate them in the future.

4. Courseware redevelopment factors. Courseware redevelopment is a viable option when the user does *not* have access to the original source code, does not have documentation or source of graphics available, and when the original source coding is incompatible with the target authoring system.
5. Operating system considerations. The three PC operating systems available offer progressively more options to the end user. While DOS is considered extremely limited as a multimedia tool, Windows 95 appears to be a very useful one.

MS DOS:

- Single-operating system.
- No built-in multimedia capabilities.
- No multitasking.
- DOS-based authoring system use varying, proprietary multimedia functionality.
- Proprietary support for digital video.

Windows 3.1:

- Multiusers operating system.
- Cooperative multitasking.
- Built-in multimedia extensions (MCI).
- Thorough support for digital video (VfW).
- Support for DLLs to share functionality.
- Authoring systems offer more compatibility.

Windows 95:

- 32-bit upgrade to 16 bit Windows 3.1.
- Preemptive multitasking.
- Faster than Windows 3.1.
- 32-bit digital video CODECs.
- Enhanced multimedia extensions.
- Enhanced high-speed graphics support (Direct Draw).

6. Conversion methodology. When considering whether to convert from one media to another, users should take the following five steps: Analyze original courseware; extract original content; convert extracted content; convert/redevelop courseware; and check the quality of the effectiveness of the converted software, including the production of CD-ROM master of the converted technology. In essence, users should determine if the item under consideration is timely, fresh, and creatively sound enough to be converted into new media.
7. Discussion of MPEG-1 versus software-only digital video. When comparing the two prevailing motion picture software technologies, the presenters recommend software-only algorithms such as Indeo. One presenter noted that as an agency, the Department of Defense chose not to develop any material using MPEG-1 technology due to lack of cross-platform compatibility and the need to add MPEG codes to each computer.

Presenters stated that the importance of video in multimedia presentations should not be

overstated. Their research has shown that there is very little need for full-screen video. Typically, users prefer a half- to quarter-screen video image to keep navigation buttons on screen.

8. Demonstrations. To show the utility of converted/redeveloped courseware and DVT technology, the presenters shared samples of interactive programs they had developed for Government clients. In addition to demonstrations of virtual reality, MPEG-1 and Indeo Interactive software, samples of courseware included applications to—
 - Emergency medical conditions.
 - Management of chemical warfare injuries.
 - Fire fighter familiarization training.
9. Multimedia industry trends. The presenters identified the following points as trends to consider as technological advances continue.
 - *CD-ROM versus videodisc.* A CD-ROM player hooked to a 486 computer will play anywhere in the world. This is not the case with a videodisc player. With the advent of digital video technology, videodisc technology is dying off.
 - *Software-only digital video is on the rise until the year 2000.* DOD is going software-only digital video. MPEG-2 will provide broadcast quality. Forecasters say MPEG-2 capabilities will be uniformly added to computers after 2000.
 - *DVD technology will eventually replace current CD-ROM and video technologies.* Movies and games developed for DVD players will share much of the video game and the videotape market. The huge storage capacity of DVD technology will offer many advantages for training and performance support applications.
 - *Pentium CPU is ideal for today's training.* In terms of CPUs for training, attendees need not purchase anything beyond today's top line Pentium chip computers. Further advances in CPU technology are not necessary for what is typically required for human operation of most multimedia-based training applications.

Discussion

Upgrading CD-ROM burner. An attendee asked if he should continue with his plan to purchase a new CD-ROM burner, given the advent of DVD technology scheduled for release later this year. The presenters replied by saying that an upgrade at this point was unnecessary. The presenters own CD-ROM burners that are 1 and 4 years old, respectively. These models are a bit slower than the newer models, but they still do the job.

In many ways, creating a CD itself is the most cost-effective part of the multimedia development process. Presenters said that at \$600 per master and \$2.00 per copy (with case and artwork), CD-ROM technology is comparatively inexpensive. For \$2.00, an end-user gains access to courseware that includes video, still photos, text, and graphics. The low cost of CD-ROM technology is underscored when compared with videodisc technology, which is estimated at \$1,200–\$1,500 per master and \$8–\$10 per copy. Because bulk purchases reduce costs, the presenters typically order 1,000–1,200 copies of every CD-ROM they develop.

Utility of video. One attendee asked the presenters to comment on the usefulness of video in multimedia training technology. The presenters replied by reminding attendees that video is not

necessary in every case. Trainers should make their media choices based on their program needs. Up-front design is more important than simply applying technology because it is accessible.

However, when using video, the presenters said, trainers should consider using PC-based desk-top editing systems, such as Avid, and also should consider tapping existing Government video libraries. Both of these approaches will help drive down the cost of video production and postproduction.

- *Desktop video.* High-end desktop video editing systems such as Avid offer far lower cost in editing than does online editing. An Avid suite typically costs \$150 per hour, where as online editing costs \$300–\$500 per hour. Presenters reminded attendees that broadcast quality video is not typically required for training program purposes. Considering one-quarter to one-half screen size windows and the user's focus on the subject matter, high-end, broadcast quality video with special effects produced by online editing is often an unnecessary expense.
- *Video libraries.* Presenters said that before investing in new footage and programming, trainers should consult DOD's Defense Instructional Technology Information System (DITIS). DITIS has identified 797 ICW courses that use IVD for delivery, some of which may offer video footage that is applicable to trainers' needs.

Transfer of Learning: Stakeholder Partnerships To Support Full Performance

Presenters:

Steve Seitz, Public Health Specialist, Center for Substance Abuse Prevention, U.S. Department of Health and Human Services

E-mail: sseitz@samhsa.gov

Mary Broad, Ed.D., Consultant, Performance Excellence

E-mail: mary.broad@astd.noli.com

Session Overview

Dr. Broad defined transfer of learning as the effective application of new knowledge and skills by learners to their work. Quality training opportunities are only one component of successful job performance. To enhance the quality of learning, partnerships must be established between the trainers, the trainees, and those individuals within the organization who provide support and feedback to the trainee. In fact, six organizational factors have been identified as influencing individual performance:

- Clear performance specifications (expected outputs and standards).
- Necessary support (resources, clear priorities and responsibilities, sufficient time).
- Clear consequences (appropriate rewards, positive and negative responses).
- Prompt feedback (how well actual performance matches specifications).
- Necessary skills and knowledge (training/learning to produce expected performance).
- Individual capability (physical, mental, emotional capacity to perform as expected).

From this list, it is clear that training alone cannot ensure improved performance. John Newstrom's research has shown that training professionals perceive lack of reinforcement on the job to be the single greatest barrier to learning, followed by problems in the work environment and nonsupportive organizational climate. (See Broad and Newstrom, 1992). Or as one researcher reported, "If you pit a good performer against a bad system, the system will win every time." (Rummler and Brache, 1992)

Managers or other supervisors play the most crucial and powerful role in determining a successful outcome for learning transfer. Learners who go into training with a good understanding of the relevance the training will have to their work and strong supervisory support for the training are much more likely to be high performance users of that training.

Mr. Seitz showed how the Center for Substance Abuse and Prevention (CSAP) applied these principles to its training programs, developing a multiphased training program to reach State substance abuse agencies and national and local audiences. These audiences include grantee recipients, community coalition members and volunteers, prevention professionals and social services, and health care professionals and paraprofessionals.

CSAP developed the Facilitation Skills Development Process (FSDP) to train State agency personnel so that they can effect behavioral changes in their agencies and communities. The process is broken down into five stages:

-
- *Stage 1: Situation analysis.* The analysis provides for a review of agency plans, resources, opportunities, and needs.
 - *Stage 2: Planning for FSDP delivery.* Management, supervisory personnel, and CSAP consultants determine the facilitation-related training needs and select program participants.
 - *Stage 3: Three-day workshop.* Basic skills in facilitation are addressed in self-directed learning modules.
 - *Stage 3–4: Technical assistance to participants.* While applying skills from Stage 3 on-the-job, participants receive support and consultation from workshop facilitators.
 - *Stage 4: Two-day workshop.* The workshop focuses on problem solving and honing of Stage 3 skills.
 - *Stage 5: Action planning.* Managers and participants jointly plan for ongoing use of skills on the job.

By involving the managers and other supervisors in the initial planning phase and the final implementation plan development, CSAP has ensured a higher level of transfer of learning among the participants.

Discussion

During the workshops, CSAP uses three facilitators. Often managers are among the trainees. Team mentoring is also employed to build support within the group. The process is designed to get the managers and the trainees to develop a plan for learning and working together to support the training.

The role of the supervisor in the posttraining stage is also addressed. The manager and trainees work together in this stage to develop plans for implementation of the training. The final plans, Mr. Seitz noted, are always very different from what the managers envisioned in Stage 1.

Among other types of support offered to the trainees between Stages 2 and 3 is a two-way phone contact between the CSAP facilitators and the participants.

The importance of positive reinforcement for the managers was also discussed. Recognition for the role they play is essential to ensuring their continued involvement and support. Accountability must also be stressed. Organizations need to be clear about their expectations of people and tie those to performance reviews.

The key, Mr. Seitz and Dr. Broad concluded, is recognizing training as a process, not an event, involving support by stakeholders for full transfer of learning.

References

- Broad, Mary L., and Newstrom, John W. *Transfer of Training: Action-Packed Strategies to Ensure High Payoff from Training Investments*. Reading, MA: Addison-Wesley, 1992.
- Rummler, Geary A., and Bradee, Alan P. *Improving Performance: How to Manage the White Space on the Organizational Chart* (2nd edition). San Francisco: Jossey-Bass Publishers, 1995.

Modular Programming and Template Courses

Presenters:

Alanna Mitchell, Ph.D., Technology Group Manager, Walcoff & Associates, Inc.

E-mail: NETI@walcoff.com

Jerry Oakley, Ed.D., Director, Safety, Health and Environmental Management Division Multimedia Laboratory, U.S. Environmental Protection Agency

E-mail: oakley.jerry@epamail.epa.gov

Elias "Dick" Callahan, Senior Technical Associate, Booz, Allen & Hamilton

E-mail: callahan.elias@epamail.epa.gov

Kris Krutules, Training Specialist, Walcoff & Associates, Inc.

E-mail: NETI@walcoff.com

Session Overview

Dr. Mitchell began the session by defining modularized training as an analytical approach to subject matter to accomplish a given objective by breaking down training into objectives and components. The modularized approach is useful because the learner may pace himself or herself. The user only purchases or uses the components or modules he or she needs.

Modularized training is also a function of financial capability and competitive pricing. The instructional designer can use any of the modules without incurring the expense of new programming. Users only purchase the modules they need and can afford. Because modularized training is offered by many contractors, pricing is competitive.

The goal of the session was to discuss specific needs and training objectives of the different group members so that the participants could identify specific needs within their organizations.

The discussion checklist included the following:

- Who are you training?
- What are the objectives of training? Identifying your objectives makes it much easier to identify your approach.
- Which training objectives are met now? How?
- What are the best ways to achieve the objectives?
- Is the objective time sensitive?
- What resources do you already have that can be used to achieve your objectives?
- What is the best training medium to meet the objectives?
- Break down subject matter into modules. A given course or computer-based training (CBT) program should be made up of several learning modules. Within each module are lessons that address each subject area. The lessons build upon previous lessons as each module builds on each previous module.

The second speaker, Mr. Callahan, demonstrated a modular CD-ROM program for Dr. Oakley. For further information, contact Dr. Oakley.

Mr. Callahan introduced the concept of LIPS—Learning Information Performance Support. LIPS provides the framework for delivering information. Modules have been built that go into the LIPS concept. He discussed the example of the Laboratory Waste Management Training Manual, whereby an existing course package was translated into CD-ROM. He demonstrated how to navigate through the program from the Table of Contents to the User's Guide, etc.

Mr. Callahan explained the concept of Hypertext, which is rapid movement of text. Hypertext is important because it makes it easy to locate information, and it reduces the amount of time and money that would be spent if an associate or co-worker had to retrieve the requested material. For example, if the user utilizes the program to read a specific section of a CFR, but then forgets the content the following day, the user will be able to revisit the site easily. This program is particularly useful in office settings where often there is only one copy of a publication, and many people need to reference it at the same time. With the CD-ROM program, employees have immediate access at their fingertips.

The program greatly expands upon skill base and knowledge.

Mr. Callahan added that costs of programs are dependent on what the user requests (i.e., sound, video, graphics, etc.). Skills required are design and programming. The designer will require approximately 2 months to design the program at a cost of \$6,000–\$8,000 per month under contract. The programmer will also require approximately 2 months to complete the task at the rate of \$6,000–\$10,000 per month under contract. A third person, the subject matter expert, should be available to provide comments on content and organization of the program. Performance support is also important because salaries are dependent upon the performance of the module.

Last spring, the President issued an order for every agency to produce a pollution prevention plan. EPA's approach was to take a real pollution prevention plan and "genericize" it. Mr. Callahan then demonstrated that template on the CD-ROM program.

The final modularized training presentation was given by Ms. Krutules. She demonstrated a prototype used for a pharmaceutical CBT course. This prototype incorporated asthma and its effects on the respiratory system. The program included advanced graphics, sound, diagrams, and interactive animation. The cost of the package is dependent upon the client's needs. Components such as graphics and sound may be added or subtracted from the package. Both labor and technology are tied to dollar figures. The contractor should be able to break down the various unit costs and provide a basis for unit comparison.

In conclusion, the asthma demonstration was found to be very beneficial to the pharmaceutical industry because it educated the people who were actually producing and selling the drugs on what asthma is really about. Customers first need to identify objectives and a target audience before making a decision on modularized training and identify the best provider for that training.

Discussion

A participant commented that today's and the previous day's discussions have centered on defining

training objectives and audiences during a time of constantly changing technologies. He asked how he could structure a training program and format the course design assuming that later he would be able to afford to add the remaining modules or alter the format.

Dr. Mitchell explained that her approach to breaking a course down was to first consider the objectives and consider who the audience is because the objectives have a hierarchical relationship. The type of audience will dictate which modules need to be delivered. The modular approach consists of analytical steps of breaking down the objectives and breaking down the audience to achieve a match.

The same participant added that it has been his experience that the audience is already defined, and it is the job of the instructor to structure the coursework accordingly to meet the audience's needs.

Another question was posed regarding length of the course. Mr. Callahan answered that the length or time of the course is dependent upon the attention span of the audience. He suggested no more than 60 slides per module or a 15-minute time frame.

Dr. Mitchell reminded the group to keep advances in media in mind when structuring programs (i.e., Internet, online information, satellites). Instructors need to determine how best to break these new approaches down into modules for training.

ClosingClosing

Lisa Nelson of the National Enforcement Training Institute thanked the participants for attending the symposium and asked them to complete evaluation forms. She said that summaries of these proceedings will be provided to all in attendance and will be available for free downloading from the FedWorld Web site: <http://www.fedworld.gov/training>. All the handouts from the presenters will be available there as well.

A bulletin board system has been set up through FedWorld, allowing seminar participants to communicate with one another. The hope is to add Internet access to this as well. George Ziener advised participants that Federal Training World can be accessed through the Web at the following address: <http://www.fedworld.gov/training>. This puts the user into the Fed Training wall, a pilot wall currently in operation. In this area will be text files that can be read online or downloaded for free. These text files include both this year's and last year's proceedings. For a chat session available now at the bulletin-board level, use a regular modem and call FedWorld at (703) 321-3339. Log in by your name, and then type "GO TRAINING." Electronic chat rooms are set up to receive any comments. If participants have questions, they may contact Mr. Ziener at his E-mail address: gziener@ntis.fedworld.gov.

Resource Capabilities DirectoryResource Capabilities Directory

The Resource Capabilities Directory provides information about government-owned resources.

Center for Acquisition, Education, Training, & Research/Naval Postgraduate School

Contact: Walt Keays

Telephone: (408) 656-3579

Location: California

Status: Share

Design/Development Capabilities

- Instructional Design Expertise

Production Capabilities

- Video Production
- Scriptwriting Expertise

Multimedia Production

- Authoring Tools—Toolbook

High-Resolution Digital Photography

- 2-D Animation
- 3-D Animation

Evaluation Capabilities

- Design Expertise in Project/Training Evaluation
- Computer programs Project/Training Evaluation

Distribution Capabilities

-
- CD-Writer (one-at-a-time)
 - Teleconferencing Up-Link Capabilities
 - Video Teleconferencing Down-Link Capabilities—Pictel
 - Video Teleconferencing Management—Pictel

Centers for Disease Control and Prevention

Contact: Diane Dunet
Telephone: (404) 639-4457
Location: Georgia
Status: Share

Contact: Nona Gibbs
Telephone: (404) 639-3841
Location: Georgia
Status: Share/Sell

Contact: Dennis McDowell
Telephone: (404) 639-3707
Location: Georgia
Status: Share/Sell

Design/Development Capabilities

- Design Expertise in Computer-Based Instruction
- Computer Programs for Computer-Managed Instruction
- Treatment Design
- Needs Assessment Expertise
- Needs Assessment Tools
- Instructional Design Expertise
- Instructional Design Models

Production Capabilities

Video Production

-
- Scriptwriting Expertise
 - Multi-Camera Studio Production
 - Remote Video Shooting
 - Editing System—Tape

Sound Recording Studio

- Analog to Digital Conversion
- Linear Tape Editing
- Nonlinear Tape Editing

Multimedia Production

- Assymetrix Toolbook
- Macromedia Director
- Authorware Professional
- Ten Core

High-Resolution Digital Photography

- 2-D Animation—Rio
- 3-D Animation—Topaz and 3D Studio
- Elastic Reality

Evaluation Capabilities

- Design Expertise in Student Testing
- Design Expertise in Project/Training Evaluation
- Tested Models for Project/Training Evaluation

Distribution Capabilities

- High-Volume Videotape Duplication
- CD-Writer (one-at-a-time)
- CD-ROM Mastering (high volume)

-
- Teleconferencing Up-Link Capabilities
 - Teleconferencing Down-Link Capabilities
 - Teleconferencing Management

Defense Logistics Agency

Contact: Larry Totzke

Telephone: 1-800-458-7903

Location: Ohio

Status: Share/Sell

Design/Development Capabilities

- Design Expertise in Computer-Managed Instruction
- Needs Assessment Expertise
- Needs Assessment Tools
- Instructional Design Expertise
- Instructional Design Models
- Course Material Design

Production Capabilities

Video Production

- Scriptwriting Expertise
- Multi-Camera Studio Production
- Remote Video Shooting
- Analog to Digital Conversion
- Digital Editing
- Editing System—Tape
- Editing System—Digital Video
- Editing System—Digital Video Graphics

Sound Recording Studio

- Analog to Digital Conversion
- Linear Tape Editing

Multimedia Production

- Computer Presentation Graphics/Overheads

High-Resolution Digital Photography

- 2-D Animation
- 3-D Animation

Evaluation Capabilities

- Design Expertise in Project/Training Evaluation

Distribution Capabilities

- High-Volume Videotape Duplication
- CD-Writer (one-at-a-time)

Federal Emergency Management Agency, National Fire Academy

Contact: Steve Marini
Telephone: (301) 447-1352
Location: Maryland
Status: Share

Design/Development Capabilities

- Needs Assessment Expertise
- Instructional Design Expertise

General Accounting Office

Contact: Leo Greco
Telephone: (202) 512-2562
Location: Washington, D.C.
Status: Share

Contract Vehicles

- Government Facility (Intra-Agency Only)

National Library of Medicine

Contact: Craig Locatis
Telephone: (301) 496-6280
Location: Maryland
Status: Share/Sell

Contact: Jim Main
Telephone: c/o Craig Locatis, (301) 496-6280
Location: Maryland
Status: Share/Sell

Contact: Eleano Pomeroy
Telephone: c/o Craig Locatis, (301) 496-6280
Location: Maryland
Status: Share/Sell

Contact: Renee Prettyman
Telephone: c/o Craig Locatis, (301) 496-6280
Location: Maryland
Status: Share/Sell

Production Capabilities

Multimedia Production

- Authoring Tools
- HTML

High-Resolution Digital Photography

- 3-D Animation

Evaluation Capabilities

- Design Expertise in Student Testing

Distribution Capabilities

- CD-Writer (one-at-a-time)
- Teleconferencing Down-Link Capabilities

U.S. Army Environmental Training Support Center

Contact: Lois Adams
Telephone: (205) 722-5889
Location: Alabama
Status: Share/Sell

Contact: John Bramblett
Telephone: (205) 722-5865
Location: Alabama
Status: Share/Sell

Design/Development Capabilities

- Treatment Design

-
- Needs Assessment Expertise
 - Needs Assessment Tools

-
- Instructional Design Expertise
 - Instructional Design Models

Production Capabilities

Video Production

- Scriptwriting Expertise
- Multi-Camera Studio Production
- Remote Video Shooting
- Analog to Digital Conversion
- Digital Editing
- Editing System—Tape
- Editing System—Digital Video
- Editing System—Digital Video Graphics

Sound Recording Studio

- Analog to Digital Conversion
- Linear Tape Editing

Evaluation Capabilities

- Design Expertise in Student Testing
- Design Expertise in Project/Training Evaluation

Distribution Capabilities

- Teleconferencing Up-Link Capabilities
- Teleconferencing Down-Link Capabilities

-
- Teleconferencing Management

Contract Vehicles

- Government Facility (Interagency Agreement and MOU)
- Government Contractor (Interagency Agreement and MOU)

U.S. Army Training Support Center

Contact: Ann Helser

Telephone: (804) 878-4701

Location: Virginia

Status: Share/Sell

Design/Development Capabilities

- Design Expertise in Computer-Managed Instruction
- Programmed Expertise in Computer-Managed Instruction
- Computer Programs for Computer-Managed Instruction
- Treatment Design
- Needs Assessment Expertise
- Needs Assessment Tools
- Instructional Design Expertise
- Instructional Design Models
- Internet/World Wide Web

Production Capabilities

Video Production

- Scriptwriting Expertise
- Multi-Camera Studio Production
- Remote Video Shooting

-
- Analog to Digital Conversion
 - Digital Editing
 - Editing System—Tape
 - Editing System—Digital Video
 - Editing System—Digital Video Graphics
 - CD-ROM, VTT

Distribution Capabilities

- High-Volume Videotape Duplication
- CD-Writer (one-at-a-time)
- CD-ROM Mastering (high volume)
- Teleconferencing Up-Link Capabilities
- Teleconferencing Down-Link Capabilities

Contract Vehicles

- Government Facility (Interagency Agreement and MOU)

U.S. Department of Agriculture, Graduate School

Contact: Anthony Gutierrez
Telephone: (214) 767-8245
Location: Texas
Status: Sell

Contact: John Stoll
Telephone: (214) 767-8206
Location: Texas
Status: Sell

Design/Development Capabilities

- Design Expertise in Computer-Managed Instruction
- Programmed Expertise in Computer-Managed Instruction
- Computer Programs for Computer-Managed Instruction
- Treatment Design
- Needs Assessment Expertise
- Needs Assessment Tools
- Instructional Design Expertise
- Instructional Design Models

Production Capabilities

Video Production

- Scriptwriting Expertise
- Multi-Camera Studio Production
- Remote Video Shooting
- Analog to Digital Conversion
- Digital Editing
- Editing System—Tape

-
- Editing System—Digital Video
 - Editing System— Digital Video Graphics

Distribution Capabilities

- Teleconferencing Up-Link Capabilities
- Teleconferencing Down-Link Capabilities
- Teleconferencing Management

Contract Vehicles

- Government Contractor (Interagency Agreement and MOU)
- Credit Cards/Training Forms/Purchase Orders

U.S. Department of Education

Contact: Walter Chiavacci
Telephone: (202) 401-1583
Location: Washington, D.C.
Status: Share

Design/Development Capabilities

- Design Expertise in Computer-Managed Instruction
- Needs Assessment Expertise
- Needs Assessment Tools
- Instructional Design Expertise
- Instructional Design Models

U.S. Department of Health and Human Services

Contact: Ruth Salinger
Telephone: (202) 690-5549
Location: Washington, D.C.
Status: Share

Evaluation Capabilities

■ Design Expertise in Project/Training Evaluation

U.S. Department of the Interior

Contact: Jim Boyd
Telephone: (520) 638-2691
Location: Arizona
Status: Share/Sell

Production Capabilities

Video Production

- Remote Video Shooting
- Editing System—Digital Video

Distribution Capabilities

■ Teleconferencing Down-Link Capabilities

U.S. Department of Transportation, Federal Highway Administration

Contact: Celia Herndon
Telephone: (202) 366-1173
Location: Washington, D.C.
Status: Share/Sell

Design/Development Capabilities

- Needs Assessment Expertise
- Instructional Design Expertise

U.S. Department of the Treasury, Internal Revenue Service

Contact: Ken Douberly
Telephone: (703) 308-6120
Location: Virginia
Status: Share/Sell

Contact: Steve Larkin

Telephone: (703) 308-6068

Location: Virginia

Status: Share/Sell

Contact: Jeff Shapiro

Telephone: (703) 603-3135

Location: Virginia

Status: Share/Sell

Design/Development Capabilities

■ Instructional Design Expertise

Production Capabilities

Video Production

- Scriptwriting Expertise
- Multi-Camera Studio Production
- Editing System—Tape
- Editing System—Digital Video
- Editing System—Digital Video Graphics

Distribution Capabilities

- Teleconferencing Management

U.S. Environmental Protection Agency, Air Enforcement Division

Contact: Mark Siegler

Telephone: (202) 564-8673

Location: Washington, D.C.

Status: Share

Design/Development Capabilities

- Needs Assessment Expertise
- Needs Assessment Tools

Contract Vehicles

- University Agreements

U.S. Environmental Protection Agency, OARM, OA, SHEMD

Contact: Gerald Oakley

Telephone: (202) 260-1287

Location: Washington, D.C.

Status: Share/Sell

Design/Development Capabilities

-
- Design Expertise in Computer-Managed Instruction
 - Programmed Expertise in Computer-Managed Instruction
 - Computer Programs for Computer-Managed Instruction
 - Instructional Design Expertise

Production Capabilities

Video Production

- Scriptwriting Expertise
- Remote Video Shooting
- Analog to Digital Conversion
- Digital Editing

Multimedia Production

- Authoring Tools
- Iconauthor
- Toolbook 4.0

Evaluation Capabilities

- Design Expertise in Student Testing
- Computer Programs for Student Testing
- Computer Programs Project/Training Evaluation

Distribution Capabilities

- CD-Writer (one-at-a-time)

Contract Vehicles

-
- Government Facility (Interagency Agreement and MOU)
 - Government Contractor (Interagency Agreement and MOU)

U.S. Environmental Protection Agency, Office of Enforcement and Compliance Assurance, National Enforcement Training Institute

Contact: Jeff Kelly

Telephone: (202) 564-6059

Location: Washington, D.C.

Status: Share

Design/Development Capabilities

- Design Expertise in Computer-Managed Instruction
- Programmed Expertise in Computer-Managed Instruction
- Computer Programs for Computer-Managed Instruction

Production Capabilities

Video Production

- Analog to Digital Conversion
- Digital Editing

Multimedia Production

- Authoring Tools
- Toolbook
- Macromedia Director
- Authorware Professional

Evaluation Capabilities

- Computer Programs Project/Training Evaluation

Distribution Capabilities

- Teleconferencing Up-Link Capabilities
- Teleconferencing Down-Link Capabilities

U.S. Food and Drug Administration (FDA)

Contact: Robert Fatula

Telephone: (301) 443-4647

Location: Maryland

Status: Interagency Agreement/MON

Contact: Kelly Sauer

Telephone: (301) 443-4647

Location: Maryland

Status: Interagency Agreement/MON

Production Capabilities

Video Production

- Scriptwriting Expertise
- Multi-Camera Studio Production
- Remote Video Shooting
- Editing System—Tape
- 3-D Animation

Sound Recording Studio

- Analog to Digital Conversion
- Linear Tape Editing
- Digital Editing

Distribution Capabilities

-
- High-Volume Videotape Duplication
 - Teleconferencing Up-Link Capabilities
 - Teleconferencing Down-Link Capabilities
 - Teleconferencing Management

Contract Vehicles

- Government Facility (Interagency Agreement and MOU)

U.S. Navy, Naval School of Health Science

Contact: Duane Straub

Telephone: (301) 295-5757

Location: Maryland

Status: Share/Sell

Design/Development Capabilities

- Design Expertise in Computer-Managed Instruction
- Computer Programs for Computer-Managed Instruction
- Treatment Design
- Needs Assessment Expertise
- Needs Assessment Tools
- Instructional Design Expertise
- Instructional Design Models

Production Capabilities

Video Production

- Scriptwriting Expertise
- Multi-Camera Studio Production
- Remote Video Shooting

-
- Editing System—Tape

Sound Recording Studio

- Linear Tape Editing

Multimedia Production

- Authoring Tools

Distribution Capabilities

- Teletraining Capabilities